ENVIRONMENTAL RESEARCH PROGRAM 1987-1988

INVENTORY OF RESEARCH AND DEVELOPMENT PROJECTS

NOVEMBER, 1987

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PREFACE

The Inventory of Research Projects is coordinated by the Research Management Office, Policy and Planning Branch, Ministry of the Environment, and is a component of the 'Research Management Process' (1987). The report is a compilation of project summaries for research currently being funded by the Ministry, including both extramural projects carried out by universities, consultants, and other external research institutions and agencies, and research carried out within the Ministry.

ACKNOWLEDGEMENT

The preparation of this inventory was coordinated with assistance from many key contributors. The Project Liaison Officers, who prepared many of the inventory forms, played an essential role in project management and evaluation, and in providing effective liaison between the Ministry of the Environment and the project investigators. Appreciation is also extended to Nora Paradis and Anne Robertson who initiated the compilation of the inventory, and to Maura Dales who completed the editing and revision of the final version. The research investigators are gratefully acknowledged for their valuable contributions and their participation in research contributing to a better Environment in Ontario.

DISCLAIMER

Since research is a dynamic process, and it has taken several months to compile, edit and revise the inventory, some of the information on individual projects or budgets listed in this document may not be entirely up to date.

The views and ideas expressed in the project outlines are those of the authors and do not necessarily reflect the views and policies of the Ministry of the Environment, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

SCIENTIFIC RESEARCH AND DEVELOPMENT
INVENTORY OF PROJECTS
1987 - 1988

TABLE OF CONTENTS

PAGE

Introduction 1

Format of the Inventory 2

Research Advisory Committee Projects 3

Air Resources Branch Projects 167

Water Resources Branch Projects 172

Laboratory Service Branch Projects 188

Ontario Pesticides Advisory Committee Projects 231

INTRODUCTION

This inventory represents a compilation of descriptions of all research projects funded by the Ministry of the Environment (MOE) in 1987-1988. The purpose of the inventory is to foster better coordination of Environmental research in Ontario, to ensure the dissemination of research findings, and to document the commitment of the Ministry to effectively allocate resources to environmental research consistent with MOE policies and priorities.

The inventory presents profiles of individual research projects being conducted by or for Ministry Branches and Regions in 1987-1988. It includes in-house research activities as well as research generated through grants and contracts to universities, consultants and other external research institutions and agencies. Projects are classified into the following categories according to the sponsoring Committee or Branch.

- Research Advisory Committee
- Air Resources Branch
- Water Resources Branch
- Laboratory Services Branch
- Ontario Pesticides Advisory Committee

It is hoped that publication of the inventory will help further the technology transfer of environmental research funded by the Ministry of the Environment and will assist in the early dissemination of study findings.

FORMAT OF THE INVENTORY

Each project is classified as i) External or Internal, ii) Contract or Grant, and iii) Solicited or Unsolicited and the project summary includes the following headings:

Project Title and Project number	For identification purposes
Start Date	Date that the project was initiated
Short Title	For administration purposes
Principal Investigator	Contact person for additional information on the project
Liaison Officer or Supervisor	The Ministry of the Environment staff member responsible for the management of the project
Objective(s)	The purpose(s) behind undertaking the project
Project Description	A summary of the project and methodology employed.
Budget and Resources	A table of the estimated staff resources and expenditures determined at the time of approval. This budget is allocated on a project year basis (*indicates the current year) and the Man Years necessary for each year are also indicated.
Budget Source	The funding source for the project (RAC, Research Advisory Committee; ARB, Air Resources Branch; WRB, Water Resources Branch; LSB, Laboratory Services Branch; OPAC, Ontario Pesticides Advisory Committee.)
Output	Completed papers, presentations and reports relevant to the project.
External Participation	Other agencies funding or participating in the project.
Comments	Specific remarks on the project not covered under the previous headings.

RESEARCH ADVISORY COMMITTEE (RAC) PROJECTS

PROJECT NO.	TITLE	PAGE
099C	Trace Organic Contaminant Removal from Drinking Water	16
103C	Mutagenicity Testing of Leachates from Waste Disposal Sites	17
105C	Evaluation of Data of Project 28PL: 'Effects of Hydraulic Characteristics and Effluent Chlorination on the Incidence of Micro-Organisms of Public Health Significance in Receiving Waters'	18
138G	Integrated Pest Management on Field Corn: A Feasibility Study	19
142G	Experimentally Determined Mutation Rates in Lung and Bronchial Epithelia as a Primary Air Pollution Standard	20
144G	To Determine Dose - Response Relationships for Food Crops due to the Effects of Airborne Gaseous and Particulate Pollutants	21
145G	The Distribution, Origins and Behaviour of Local Shallow Groundwaters Containing Elevated Concentrations of Chlorides	22
147G	Geomechanical Investigation of the Origin and Properties of Near Surface Fractures in Clayey Till	23
149G	The Fate of Hazardous Organic Compounds in Municipal Water Pollution Control Plants	24
150G	Development of Predictive Organic Contaminant Structure - Property - Toxic Relationships for Aquatic Organisms	25
152G	The Effects of Tile Drainage and Open Ditches on Peak Flows and Dry Weather Flows	26

PROJECT NO.	TITLE	PAGE
153G	Laboratory and Numerical Model Studies to Design Criteria for Optional Recovery of Leachate Under Sanitary Landfills	27
162G	Development of a Methodology for Use of Freshwater Clams as a Biological Response System to Monitor the Nearshore Environment of the Lower Great Lakes	28
165G	The Quantitative Assessment of Toxicity of Ingested and Inhaled Halogenated Aromatic Hydrocarbons (Dioxins etc.)	29
170G	Syntheses of Oxygen and Sulphur PAHs of Interest in Environmental Pollution and Toxicology	30
177C	Application of Taga 6000 Method in the Measurement of Dioxin and Furan Emissions at Municipal Solid Waste Incinerators	31
180C	Applying New Technology for Defluoridation of Water Supply Systems	32
184G	Grit Removal at Sewage Treatment Plants Using a Low Pressure Hydrocyclone	33
193C	In situ Assessment of Mixed Copper and Zinc Impacts on White Sucker (Catastomus commersoni) Populations in Several Northern Ontario Lakes: An Evaluation of the Environmental Health Assessment to Validating Water Quality Criteria	34
194G	Multi - Media Environmental and Human Exposure Assessment of Organic Contaminants	35
195G	Degradation of Organic Contaminants by Anaerobic Bacteria in Lake Ontario Sediments	36
196G	Validation and a Possible Reassessment of Clam Caging Experiments Using Elliptio Complanatus as Biomonitors for Toxic Contaminants in Water	37

PROJECT NO.	TITLE	PAGE
197G	Monitoring the Chemical and Biological Impact, as Measured by Physiological Stress in Fish, of Episodic Events of Acid Precipitation and Snow Melt	38
198G	Humber River/Black Creek: Detailed Bacteriological Water Quality Study Examining the Impact of Sediment and Survival Times	39
199G	Bioaccumulation of Mercury by Yellow Perch	40
200G	PAH Analysis of Environmental Samples at Low Temperature Using Fluorescence Detection	41
201G	Estimation of Ambient Water Qualities in Ontario Rivers to Identify and Manage Potential Water Quality Problems	42
202C	A Full Scale Study of the Effect of Wastewater Variable on the Efficacy of Ultraviolet Disinfection	43
203G	Effects of Rural and Suburban Development on Surface Water Quality in Five Selected Subwatersheds in the Upper Humber River	44
204C	Proposal to Prepare a Case History of Cheese Whey Concentration by Reverse Osmosis	45
205C	Evaluation of Native Marsh Plant Species for Treatment of Domestic Sewage	46
207G	Screening Methods for Air and Water Samples: Application of Inductively Coupled Plasma Mass Spectrometry (ICP/MS) to Elemental Analysis	47
209G	Waste Management Planning for the Pharmaceutical Industry	48
211C	To Develop the GC/MED System as Non GC/MS screening Technique	49

PROJECT NO.	TITLE	PAGE
212G	Monitoring Environmental Genotoxicity Using Sister Chromated Exchanges in Mice	50
213G	Effect of Increasing Amounts of Non-Polar Organic Liquids in Domestic Waste Leachate on the Hydraulic Conductivity of Clay Liners in Southern Ontario	51
214G	Evaluation of Contaiminant Velocity Groundwater in Low - Permeability Fractured Shale	52
215C	Biological Indicator System to Identify Genotoxicity of In - Place Pollutants	53
217C	Development of Guidelines to Control the Disposal of Wastes as Backfill Material in Ontario	54
218G	Sewage Sludge Compost as Turf Fertilizer	55
219G	Dose Response for Selected Environmental Air Pollution on Selected Populations	56
220G	Mutagenicity of Complex Mixtures of Polycyclic Aromatic Hydrocarbons in Ambient Air Particulate Matters (APM)	57
221C	Building Wake Study at Darlington	58
223C	Application of Robotics to the Analysis of Trace Organics	59
226C	Development and Validation of a Methodology for Assessing the Relative Environmental Hazards of Chemical Contaminants	60
228G	Contributions to the Understanding of the Sulphur Cycle in the Dorset Watershed	61
229C	The Feasibility of Biomass Removal in Shallow Impoundments as a Means of Reducing Nutrient Loading	62

PROJECT NO.	TITLE	PAGE
230G	Development of an Ultrasonic Webulizer for Stable and Reproductive Production of Aerosols for Atomic Spectrometric Analysis	63
231C	Development of a Standard Clam Biomonitoring Methodology for the Detection of Trace Contaminants within Waters of the Ontario Great Lakes Region	64
232C	Determining Sulphur Dioxide Mass Emission Fluxes by Stack Scanning: Phase II	65
233G	Development of Polysulfide Technology for Treatment of Concentrated Spent Cyanide Liquors	66
234C	Municipal Solid Waste - Feasibility of Gasification with Plasma ARC	67
235C	Ottawa River Nuclear Spill Contingency Model Development - Phase II	68
237G	The Use of Various Bacterial Short - Term Tests to Screen Industrial Effluents for Mutagenic Activity	69
238C	Water Use Study in Ontario Kraft Mills	70
240G	Assessment of Contaminant Migration from Industrial and Landfill Sources in the Twelve Mile Creek and Welland River Watersheds	71
241G	The Use of Aquatic Vegetation and Invertebrates to Monitor Chlorinated Hydrocarbons in the Lake Huron - Lake Erie Corridor	72
242G	Toxicity of Pentachlorophenol to Zooplankton: Fat and Effects	73
243G	Demonstration of the Process at Lakeview WPCP	74
244G	Treatment of Landfill Leachate by Spray Irrigation	75

PROJECT NO.	TITLE	PAGE
245G	Reproductive Outcomes in Southwestern Ontario	76
246G	Study of the Thermal Reactions of Polychlorinated Dibenzo-p-Dioxins on Flyash Particles under Incinerator Conditions	77
248G	Metal Uptake by Cladophora Glomerata in the Niagara River	78
249G	Bioassessment of Contaminated Sediments	79
250G	Development of an Expert System for Decision Making with Regard to Water Quality in Ontario Rivers	80
251G	Pathogenesis of Neoplastic Diseases Afflicting Feral Fish	81
252G	Township of Ignace Groundwater Quality Identification	82
254G	Study of the Spatial Distribution of the Impact of Sudbury Smelting Emissions	83
255C	Investigate the 'Short Term' Mutagenicity and Chemical Composition of Organic Solvent Extraction Fraction of Coke Oven Emissions - Phase II	84
256C	Sediment Transport Study	85
257C	Retractable Composite Absorbents for Environmental Clean - Up	86
258C	Sound Levels at a Distance From Industrial Plants	87
259G	Application of the Fugacity Model to Predicting the Behaviour of Arsenic in the Environment	88
260G	Accumulation and Pathways of Mercury in Benthic Invertibrates	89
261G	Dispersion of the Stouffville Contaminant Plume	90

PROJECT NO.	TITLE	PAGE
262G	Treatment of Municipal Sewage Lagoon Effluent by Means of Rapid Infiltration at Markdale	91
264C	A Method for Prevention and Mitigation of Nuisance Blue-Green Algal Blooms in Eutrophic Waters in Ontario	92
265C	Biotechnology and the Resource Sector: The Need for Policy Development	93
266C	Improvements to the 'OPTSTOR' Program for Determining Optimum In-System Storage Requirements in Over-Loaded Sewer Systems	94
267G	Lake Water Quality Monitoring Based on Remotely Sensed Data: An Interdisciplinary Study	95
268C	A Study of High Temperature Photochemical Kinetics of Sulphur Dioxide and Nitrogen Oxides for a Flue Gas Treatment Process	96
269G	Factors Influencing Trace Metal Levels in Zooplankton in Ontario Lakes	97
270G	Development and Evaluation of Methods and Instrumentation for the Direct Analysis of Solids by Inductively Coupled Plasma Atomic Emission Spectrometry	98
271G	The Effects of pH, Aluminum and Drought on Sugar Maple Seedlings	99
272G	Identification of Long Range Aerosol Sources at the Dorset Environmental Station	100
273G	Perception and Use of Water Demand Management Strategies in Ontario Municipalities	101
274G	Characterization of the Fecal Indicator Bacterial Flora of Sanitary Sewage with Application to Identify the Presence of Sanitary Waste in Storm Sewers	102

PROJECT NO.	TITLE	PAGE
275G	An Ecosystem Approach to the Monitoring of Organic Aquatic Contaminants in the Muskoka - Haliburton Region	103
276G	Klebsiella Pneumoniae Membrane Filtration Procedure	104
277C	Availability of Zinc to Benthic Organisms from Sediment Fractions	105
278C	Trend Analysis Procedures for PWQMN Data Series	106
279C	Assessment of the Influence of Various Factors on Water Use Across Ontario - Stage I	107
280C	Demonstration of Automated Jar Tester	108
281C	Regional Analysis of Low - Flow Characteristics	109
282G	Study of Some Factors Contributing to the Abundance and Persistence of Green Filament Algal Mats in Acidic Lakes	110
283G	Effect of Fine Particles on the Respiratory Health of a Cohort of Young People	111
284C	Development of a Control Strategy to Manage Dynamic Fluctuations in Trace Contaminants in Sewage Treatment Plant Effluents	112
285C	Sinter Plant Stack Opacity Preconditioned Spray System	113
286G	Methods of Measurement and Speciation of Mercury in Natural Waters and Its use in Assessing Mercury Contamination in Huntsville Area Lakes	114
287G	Field Trials of Developed DNA Probes for Determining Bacterial Pollution Source Inputs	115

PROJECT NO.	TITLE	PAGE
288G	Development and Critical Evaluation of a Dual Column Gas Chromatography Method for the Determination of Polycyclic Aromatic Compounds in Environmental Samples	116
289C	Kirkland Lake Water Treatment Plant Alternative Process Research	117
290G	Nature of Substrates in Industrial Wastes Relative to Elemental Leachability	118
291C	A Field Evaluation of the Overland Flow Method for the Removal of Organic Compounds from Groundwater	119
293C	To Conduct a Study on the Structure of the Liquid Waste Management (Transportation) Section in Ontario	120
295G	A Chromogenic Reagent for the Detection of E. Coli	121
296C	Slow Sand Filtration for Production of Drinking Water in Small Northern Communities	122
297C	An Evaluation of a Sampling Scheme Using Hi-Vol/Sorbent Cartridge for Sampling of Dioxins/Furans in Ambient Air in Ontario	123
298C	An evaluation of a Hi-Vol/Denuder/Sorbent Sampling Scheme for Measurements of Polynuclear Aromatic Hydrocarbons (PAHs) in Ontario	124
299C	Clay/Leachate Compatability Study: Hydraulic Conductivity of Ottawa-Carleton 'Leda' Clay Barrier Soils Permeated with Domestic Waste Leachate	125
300G	An Intrinsic Chemically Selective Lipid-Based Wave Guide Organic Vapour Sensor	126
301G	Fossil Chrysophycean Cyst Assemblages as Paleoindicators in Acidified Lakes	127

PROJECT NO.	TITLE	PAGE
303C	Technical and Economic Assessment Reverse Osmosis for Treatment of Landfill Leachate	128
304G	Provision of Isomerically Pure Nitro-PAH Analytical Standards	129
305C	Utilization of Established Air Pollution Monitoring Networks in Ontario Following Nuclear Incidences	130
306C	An Evaluation of the Problems of Particulate Emissions from the Wood Products Industry	131
307C	Establishing Vegetation on Erosion - Prone Landfill Slopes in Ontario	132
308C	Enhanced Sanitary Landfill: A Demonstration Trial	133
309G	Detectability of Step Trends in the Rate of Atmospheric Deposition of Sulfate	134
310C	Scale Model Studies and Development of Prediction Procedures for Heavy Gas Dispersion in Complex Terrain	135
311G	Development of Multivariate Analysis Procedures for Ontario Air Quality Data	136
312G	Modelling the Photochemical Decomposition of Chlorinated Phenols by Sunlight	137
313G	Physical and Chemical Processes Affecting Long - Range Transport of Air Pollutants and Acid Rain	138
314G	Atmospheric Trace Gas Measurements Using a Turnable Diode Laser Absorption Spectrometer	139
315G	The Effects of Forestry Operations Upon the Environment of Ontario	140

PROJECT NO.	TITLE	PAGE
316G	A Study of the Economic Factors Relating to the Implementation of Resource Recovery, Recycling or Zero - Discharge Waste Reduction Technologies for Heavy-Metal Generating Industries in Canada	141
317G	Quantitative Structure - Activity Relationships for Organic Compounds and Their Mixture	142
318G	The Long Term Effects of Acute and Sub-Chronic Pentachlorphenol Exposures on the Growth and Lipid Reserves of Centrarchid Fishes	143
319C	To Investigate, Evaluate and Recommend Organisms as Biomonitoring Tools for Procedures Development for Monitoring of Site Specific Industrial and Municipal Discharges and Non-Point Sources	144
320G	An Examination of the Chronic Toxicity of Thocyanate to Freshwater Fish for the Development of a Water Quality Criterion	145
321G	The Effects of Agricultural Drainage on Sediment and Water Quality Loadings	146
322G	Biomonitoring Protocols for Adult Aquatic Insects	147
323G	Development of Liquid Crystal Capillary Columns for Analysis of Polychlorinated Dioxins and Furans by GC/MS	148
324G	Procedure for the 2, 3, 7, 8 - Substituted Analysis of PCDD, PCDF, and Other Target Compounds in Environmental Samples	149
325G	Preparation of Heterocyclic Polynuclear Aromatic Hydrocarbons for Analytical Standards	150
326G	An Expert System for Quality Assurance in Analytical Chemistry	151

PROJECT NO.	TITLE	PAGE
327G	Solid - Supported Isolation and Derivatization - An Approach to Automation of Environmental Organic Analysis	152
328G	Detection and Quantification of Herbicides in Soil, Water and Plant Extracts using an Enzyme Linked Immunosorbent ASSAY (ELISA)	153
329G	Refinement and Testing of a Preconcentration Sampler for Dioxins in Water	154
330G	The Mobility and Persistence of Selected Organic Solute in Anaerobic Groundwaters and Possible In-Situ Remediation Measures	155
331G	In-Situ Assessment of Mixed Copper and Zinc Impacts on White Sucker (Catastomus commersoni) Populations in Several Northern Ontario Lakes: An Evaluation of the Environmental Health Assessment to Validating Water Quality Criteria	156
332G	Development of an Expert System for Decision Making with Regard to Water Quality in Ontario Rivers	157
333G	Slow Rate Infiltration Land Treatment and Recirculation of Landfill Leachate in Ontario	158
334G	Behaviour, Detection and Control of Hazardous Immiscible Liquid Movement in Soil	159
336C	Development of the Backfill and Construction Application Guidelines - Phase II	160
337C	Control of Nuisance Blue-Green Algal Blooms in Eutrophic Waters Via Enhancement of Aerobic Microbial Respiration	161

PROJECT NO.	TITLE	PAGE
338G	Sulphur and Oxygen Isotope Composition in Aqueous Sulphate in a Dorset Watershed and Their Role in Acid Rain Sulphur Cycle	162
339C	Technology Review of Biological Treatment of Trace Level Toxicants in Landfill Leachates	163
340C	The Development of a Procedure to Evaluate the Erosion of Landfill Covers	164
341C	Study of the Discharge of Grey Water from Pleasure Boats	165
342G	Plant Bioassays for the Detection of Environmental Mutagens in an Aquatic Environment	166

EXTERNAL X Contract X Solicited X
INTERNAL Grant Unsolicited

Date : May 28, 1987
Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Trace Organic Contaminant Removal From Drinking Water

PROJECT NO: 099C
START DATE: (m/yr): Mid-85
RES. PRIORITY:

SHORT TITLE: Drinking Water

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Mr. John Hilton
MacLaren Plansearch

LIAISON OFFICER: (name, location, phone no.) K. Roberts - Water Resources Branch
323-4881

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. To assess the effectiveness of both optimized conventional drinking water treatment and activated carbon adsorption (add-on contactor mode) for the removal of trace organic contaminants.
2. To determine process operational parameters for both systems.

PROJECT DESCRIPTION: The project is designed to investigate the removal of trace organics from drinking water by conventional treatment and fixed bed granular activated carbon (GAC) treatment.

Since the project was begun in mid-1985, a number of activities have been ongoing leading to the Phase I report. These are;

1. Selection of target compounds for both the conventional and GAC evaluation phases of the study.
2. Development of analytical methodology to measure target compounds to the low parts per trillion (PPT) level.
3. Development of the detailed experimental plan to monitor performance and minimize analytical requirements.
4. Design of the database management system and statistical data evaluation methodology.

Work has begun on Phase II which involves:

1. Bench scale testing to optimize coagulant and coagulant aid dosages to achieve maximum organics removal.
2. Pilot equipment set-up and characterization testing of the target compound dosing system and the possibility of adsorption of these compounds on the pilot plant equipment.

BUDGET AND RESOURCES:	Year: (* current)	2	3 *	4	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :	148.7	475.1	262.9	940.9
Source:RAC	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: Progress / Status under review

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X Contract X Solicited
INTERNAL Grant Unsoliticed X

Date : May 28, 1987
Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Mutagenicity Testing of Leachates From Waste Disposal Sites
PROJECT NO: 103C
START DATE: (m/yr): 09/84
RES. PRIORITY:

SHORT TITLE: Leachates
MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	G.H. Thomas, D.K. Smith and A.J. Horton Ontario Research Foundation
LIAISON OFFICER: (name, location, phone no.)	D. Rokosh - Water Resources Branch, Resources Road 235-5787

INTERNAL PROJECTS
Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To develop methods based on the Ames Salmonella Mutagenicity Assay to detect potentially harmful contamination of groundwater supplies by genotoxic substances leached from landfill sites.

PROJECT DESCRIPTION: A selection of chemical compounds (suspected/known mutagens) exhibiting different functional group features and representing a wide range of polarity in order to develop and validate methods for the collection of organic extract concentrates from both groundwater and site matrix materials. The extracts must be suitable for use in the Ames bioassay. The collection method must be capable of providing sufficient amounts of extract for both initial screening in the Ames assay and any follow-up testing in other bioassay systems. The demonstration of the application of the methodology for the collection of organic concentrates of groundwater and site matrix materials from a representative area within a selected landfill site. The various extracts will be evaluated for mutagenic activity. By comparison of the mutagenicity found in the matrix extracts, it may be possible to develop an index of leachability for mutagenic material that can be related to the mutagenicity found in the associated groundwater.

BUDGET AND RESOURCES:	Year: (* current)	1	2	3 *	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	83.0	91.6	25.0	199.6
	Salaries :	67.0	33.4		100.4
Budget Source:RAC	Total :	150.0	125.0	25.0	300.0
	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract X	Solicited	Date : May 28, 1987
INTERNAL	Grant	Unsolicited	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Evaluation of Data of Project 28PL: `Effects of Hydraulic Characteristics and Effluent Chlorination on the Incidence of Micro-Organisms of Public Health Significance in Receiving Waters'

PROJECT NO: 105C
START DATE: (m/yr): 02/85
RES. PRIORITY:

SHORT TITLE: Data Evaluation for 28PL

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Dr. M. Palmer
Gore & Storrie Limited

LIAISON OFFICER: T. Ho - Water Resources Branch
(name, location, phone no.) 323-4980

INTERNAL PROJECTS

Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S):-To develop a critque of the statistical methodology used by Beak (project 28) and to devise a new approach if the former is inappropriate.
-to integrate all the data in the appropriate model.
-to conduct statistical analysis of data to fulfill the objectives of the Beak study (project 28PL).
-Further details are presented in the Request for Proposal.

PROJECT DESCRIPTION: The generated data should fulfill the objectives of the original study, and should be of a nature to develop guidelines and criteria for efficient disinfection in Ontario.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	12.8			12.8
	Salaries :	14.1			14.1
Budget Source:RAC	Total :	26.9			26.9
	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X Contract Solicited
INTERNAL Grant X Unsolicited X

Date : May 28, 1987
Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Integrated Pest Management on Field Corn: A Feasibility Study

PROJECT NO: 138G
START DATE: (m/yr): 05/84
RES. PRIORITY:

SHORT TITLE: I.P.M.

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Wayne Roberts, Program Manager, Pest Management OMAF, Guelph Agriculture Centre
LIAISON OFFICER: (name, location, phone no.)	J. Lucas - Hazardous Contaminant Coordination Branch 323-5111

INTERNAL PROJECTS

Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. To define the scope of the problem through a survey of the pest complex (insects and weeds) in field corn;
2. To evaluate available monitoring techniques with emphasis on combining various methods in a total program suitable for Integrated Pest Management;
3. To demonstrate the capability of making cost-effective Integrated Pest Management decisions for field corn.

PROJECT DESCRIPTION: Approximately 1/2 of the 0.8M hectares of field corn grown annually in Ontario are treated with insecticides for rootworm control. Previous studies have shown that this extent of pesticide usage is unwarranted, but a suitable data base for evolving an Integrated Pest Management approach in unavailable. The present study would therefore monitor some 20 field sites for both weeds and insects. Monitoring techniques presently recommend for each pest would be evaluated. Research inputs from Agriculture Canada and the University of Guelph, combined with the survey data, would then be used to evaluate the effectiveness and reliability of an IPM program for field corn.

BUDGET AND RESOURCES:	Year: (* current)	3	4 *	5	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget Source:RAC	Total :	80.8	74.7	81.7	378.1
	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports): Annual Reports: 1985, 1986, 1987.

EXTERNAL PARTICIPATION (ministries, governments, agencies):
OMAF and University of Guelph

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X Contract Solicited
INTERNAL Grant X Unsolicited X

Date : May 25, 1987
Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Experimentally determined Mutation Rates in Lung and Bronchial Epithelia as a Primary Air Pollution Standard

PROJECT NO: 142G
START DATE: (m/yr): 01/85
RES. PRIORITY:

SHORT TITLE: Mutation Rates

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: John A. Heddle, Department of Biology
York University

LIAISON OFFICER: (name, location, phone no.) M. Salamone - Water Resources Branch, Resources Road
235-5790

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): Development of a mutagenic test for atmospheric contaminants using cells derived from the lining of the lung and the bronchus.

PROJECT DESCRIPTION: - Phase I of the study was satisfactorily completed
- A paper was presented at the Technology Transfer Conference No. 6
- An interim payment of $30,000 was approved to provide continuity of the research
- Approval of the balance of $78,909 was granted to carry out Phase II of the study.

BUDGET AND RESOURCES:	Year: (* current)	1	2 *	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	25.1	40.8		65.9
Budget Source:RAC	Salaries :	64.0	68.1		132.1
	Total :	89.1	108.9		198.0
	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
Budget Source:	Salaries :				
	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies): None

COMMENTS: Requested third year funding; proposal # 837

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : June 29, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: To Determine Dose-Response Relationships for Food Crops due to the Effects of Airborne Gaseous and Particulate Pollutants

PROJECT NO: 144G
START DATE: (m/yr): 07/84
RES. PRIORITY:

SHORT TITLE: Dose Response

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: D.P. Ormrod, Department of Horticultural Science
University of Guelph

LIAISON OFFICER: (name, location, phone no.) D. Harper - Air Resources Branch
456-2504

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. To determine response of tomatoes, potatoes, cabbages, carrot, soybean, corn and wheat to ozone.
2. Dose-response relationships for visible injury and growth rates under long-term exposure at ambient levels in polluted regions.
3. To provide objective data on relationships between pollutant concentrations and plant growth and yield, and to indicate the acceptable levels to protect food crops from damage.

PROJECT DESCRIPTION: Controlled ozone exposure experiments are to be conducted at the University of Guelph using tomatoes, potatoes and cabbages. Visible injury, growth and effects will be evaluated. Statistical and experimental procedures leading to the development of response curves and surfaces will be used to graphically portray plant responses. Dose-response relationships will be expressed. Direct comparisons will be made with monitored levels of pollutants in contaminated regions and emphasis will be placed on the utilization of 7-hours per day regimes in ozone studies.

BUDGET AND RESOURCES:	Year: (* current)	1	2	3 *	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	5.0	5.0	5.0	15.0
Budget Source:RAC	Salaries :	24.9	24.9	24.9	74.7
	Total :	29.9	29.9	29.9	89.7
	Man Years :	1.6	1.6	1.6	4.8
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
Budget Source:	Salaries :				
	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports): Three Technology Transfer Conference presentations (1 per year) and a refereed publication.

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X Contract Solicited Date : June 29, 1987
INTERNAL Grant X Unsolicited X Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: The Distribution, Origins and Behaviour of Local Shallow Groundwaters Containing Elevated Concentrations of Chlorides

PROJECT NO: 145G
START DATE: (m/yr): 10/84
RES. PRIORITY:

SHORT TITLE: Chloride in Water

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Professor K.W.F. Howard, Division of Physical Sciences University of Toronto, Scarborough Campus

LIAISON OFFICER: (name, location, phone no.) P. McKenna - Water Resources Branch 323-4892

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. To determine natural background levels of groundwater contaminants and identify their sources.
2. To determine chemical behaviour of groundwater contaminants, their migration and accumulation rates and to evaluate regional magnitude of the problem.

PROJECT DESCRIPTION: 1. Literature and land use data will be reviewed, and sampling and analyses of groundwater for background data and site selection will be developed.

2. Contaminated groundwater will be analyzed to identify contaminant migration and accumulation.

Completion of this project will provide MOE with a protocol to identify point and non-point contamination sources and with the capability to predict long-term hazard from non-point sources of contamination.

BUDGET AND RESOURCES:	Year: (* current)	1	2	3 *	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	8.2	11.8	10.2	30.2
	Salaries :	16.8	16.8	16.8	50.4
Budget	Total :	25.0	28.6	27.0	80.6
Source:RAC	Man Years :	1.8	1.8	1.8	5.4
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):
Papers presented at Tech. Trans. Confs., 1985 and 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X Contract Solicited Date : May 26, 1987
INTERNAL Grant X Unsolicited X Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Geomechanical Investigation of the Origin and Properties of Near Surface Fractures in Clayey Tills

PROJECT NO: 147G
START DATE: (m/yr): 01/85
RES. PRIORITY:

SHORT TITLE: Clayey Tills

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Maurice B. Dusseault, Geological Engineering University of Waterloo

LIAISON OFFICER: (name, location, phone no.) A. Scott - Waste Management Branch 323-5218

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. To determine the distribution and properties of fractures in clayey glacial deposits.
2. To define possible processes by which fractures in clayey deposits were created.
3. To assess the geomechanical effects of clayey till fractures on the flow of leachate through the weathered zone.

PROJECT DESCRIPTION: It is proposed to investigate the geomechanical behaviour of fractured clayey till in an attempt to probe the origin of these fractured zone. The potential of these fracture networks to allow contaminant migration is of concern to environmental agencies. Studies dealing with the changes in hydrogeologic characteristics under various stress and hydraulic pressure conditions are essential to better evaluate the suitability of these deposits for waste disposal.

BUDGET AND RESOURCES:	Year: (* current)	1	2 *	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	15.7	3.8		19.5
	Salaries :	9.9			9.9
Budget	Total :	25.6	3.8		29.4
Source:RAC	Man Years :				2.0
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract	Solicited	Date : May 25, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: The Fate of Hazardous Organic Compounds in Municipal Water Pollution Control Plants

PROJECT NO: 149G
START DATE: (m/yr): 07/84
RES. PRIORITY:

SHORT TITLE: Organic Compounds

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Glynn Henry and Donald Mackay University of Toronto
LIAISON OFFICER: (name, location, phone no.)	T. Ho, Water Resources Branch 323-4980

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To develop a model and protocol for the prediction of fate of hazardous organic compounds in municipal water pollution control plants.

PROJECT DESCRIPTION: Literature will be reviewed, analytical methods developed for a selection of hazardous chemicals, and a laboratory model simulating a municipal wastewater treatment system will be constructed. The latter will be tested and used to study the fate of hazardous contaminants in control and actual wastewater samples. The refined model will be applied to data obtained from a full-scale plant.

The present study complements several related studies now in progress such as: hazardous contaminants in WPCP in Hamilton, development of a routine protocol for wastewater analyses, etc.

BUDGET AND RESOURCES:	Year: (* current)	1	2	3 *	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	6.0	6.3	6.7	19.0
	Salaries :	13.0	13.7	14.3	41.0
Budget	Total :	19.0	20.0	21.0	60.0
Source:RAC	Man Years :	1.1	1.1	1.1	3.3
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract	Solicited	Date : May 25, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Development of predictive organic contaminant structure-property-toxic relationships for aquatic Organisms

PROJECT NO: 150G
START DATE: (m/yr): 07/84
RES. PRIORITY:

SHORT TITLE: Aquatic Organisms

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. D. Mackay, Department of Chemical Engineering University of Toronto
LIAISON OFFICER: (name, location, phone no.)	John Ralston - Water Resources Branch 323-4924

INTERNAL PROJECTS

Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To develop methods to correlate organic contaminant structure to its physical properties, organism uptake rates and toxic effects.

PROJECT DESCRIPTION: The physical properties of a wide selection of organic compounds (30-50) will be correlated to their molecular structure and toxicity levels. The latter will be extended to include bioassays. The findings will be extended to link with MOE toxicity data on both individual and mixtures of hazardous chemicals.

BUDGET AND RESOURCES:	Year: (* current)	1	2	3 *	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	6.0	6.0	6.0	18.0
	Salaries :	13.0	13.0	13.0	39.0
Budget Source:RAC	Total :	19.0	19.0	19.0	57.0
	Man Years :	1.1	1.1	1.1	3.3
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract	Solicited	Date : May 25, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: The Effects of Tile Drainage and Open Ditches on Peak Flows and Dry Weather Flows

PROJECT NO: 152G
START DATE: (m/yr): 11/84
RES. PRIORITY:

SHORT TITLE: Peak Flows

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	W. Edgar Watt, Professor of Civil Engineering Queen's University
LIAISON OFFICER: (name, location, phone no.)	Lloyd Logan - Water Resources Branch 323-4984

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To assess the effects of tile drainage and open ditches and dry weather flows with particular application to Ontario.

PROJECT DESCRIPTION: A simulation model for tile-drained agricultural fields and basins will be developed and evaluated. The developed technique will be used to study tile drained fields in the South Nation River.

The study will provide an improved tile drain design that reduces erosion and produces information necessary for the development of drainage guidelines.

BUDGET AND RESOURCES:	Year: (* current)	1	2	3 *	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	3.0	3.6	5.0	11.6
	Salaries :	19.0	20.0	20.0	59.0
Budget	Total :	22.0	23.6	25.0	70.6
Source:RAC	Man Years :	1.5	1.4	0.9	3.8
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports): Paper presented at Tech. Trans. Conf., 1985, Poster presented at Tech. Trans. Conf., 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract	Solicited	Date : May 26, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Laboratory and Numerical Model Studies to Design Criteria for Optimal Recovery of Leachate under Sanitary Landfills

PROJECT NO: 153G
START DATE: (m/yr): 09/84
RES. PRIORITY:

SHORT TITLE: Leachate Recovery

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	R.N. Farvolden, R.W. Gillham, and E.O. Frind University of Waterloo
LIAISON OFFICER: (name, location, phone no.)	M. Goodwin - Waste Management Branch 323-5217

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): -Evaluation of tile drain systems as a method for leachate capture and development of criteria for their design.
-Development of criteria for overall design of landfills to enhance leachate capture

PROJECT DESCRIPTION: To modify a scaled physical model landfill to simulate the effects of tile configuration on leachate capture and migration for different settings including clay liners under varying simple but realistic hydrogeologic and climatic conditions.

To test a numerical model for conditions tested physically and extend model to account for anistropy and simple layered media and use the model to evaluate and predict effectiveness of leachate capture for various tile configurations and hydrogeologic settings.

BUDGET AND RESOURCES:	Year: (* current)	1	2	3 *	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	8.5	8.8	11.9	29.2
	Salaries :	22.2	28.1	27.6	77.9
Budget	Total :	30.7	36.9	39.5	107.1
Source:RAC	Man Years :	0.3	0.3	0.3	0.9
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Confs., 1985 and 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : May 25, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Development of a Methodology for use of Freshwater Clams as a Biological Response System to Monitor the Nearshore Environment of the Lower Great Lakes

PROJECT NO: 162G
START DATE: (m/yr): 08/84
RES. PRIORITY:

SHORT TITLE: Freshwater Clams

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Dr. Roger H. Green, Department of Zoology
University of Western Ontario

LIAISON OFFICER: (name, location, phone no.) P.B. Kauss - Water Resources Branch
323-4952

INTERNAL PROJECTS

Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. To select biological response variables related to molluscs in Lake Erie.
2. To identify analytical methods and contaminants, and evaluate the use of bivalve mollusc shells to generate time-profile environmental impact data.
3. To develop statistical models which predict biological response from environmental quality.
4. To assess the generality of the developed models at several locations and assess genetic components of the biological response.

PROJECT DESCRIPTION: Conduct field studies in the Long Point Bay area to establish the the dominant mollusc species and environmental and biological gradients. Genetic and morphological variability will be determined for various mollusc species from this area and some contaminated sites. Analytical methods for shell constituents will be evaluated. Predictive models which relate responses of bivalve molluscs to environmental gradients and quality will be developed and tested.
The study will provide the Ministry with an inexpensive, long-term method for assessing the quality of Great Lakes nearshore environment using molluscs for bio-monitoring.

BUDGET AND RESOURCES:	Year: (* current)	1	2	3 *	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	26.4	8.0	6.2	40.6
	Salaries :	5.0	16.4	11.4	32.8
Budget	Total :	31.4	24.4	17.6	73.4
Source:RAC	Man Years :	0.4	1.5	1.1	3.0
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports): Presented- 1986 Technology Transfer Conference. Several other publications are available on request from the investigator.

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract	Solicited	Date : May 26, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: The Quantitative Assessment of Toxicity of Ingested and Inhaled Halogenated Aromatic Hydrocarbons (Dioxins etc.)

PROJECT NO: 165G
START DATE: (m/yr): 09/84
RES. PRIORITY:

SHORT TITLE: Aromatic Hydrocarbons

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Drs David Clark and George Sweeney, Dept. of Medicine McMaster University
LIAISON OFFICER: (name, location, phone no.)	Dr. B. Birmingham - Hazardous Contaminants Coordination Branch 323-5105

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1) To obtain information on suppression of the immune response by halogenated aromatic hydrocarbons, including TCDD, PCBs and PBBs;
2) To develop sensitive, non-invasive techniques for biological monitoring of toxic effects of aromatic hydrocarbons;
3) To clarify the effect of age and route of exposure on "no demonstrable effect" dose level.

PROJECT DESCRIPTION: The work is concerned with immunosuppression and due to the stage of knowledge in this area, it is largely limited to studies on inbred strains of mice and observations on human subjects. Further, the nature of current immunological techniques is that the gap between development of approaches for immune surveillance in the mouse is likely to become applicable to humans. It is proposed to study immunosuppression in inbred strains of mice by purified haloaromatic hydrocarbons such as TCDD and environmentally derived samples through collaborative links. The goal is to develop assays which will have application to human populations.

BUDGET AND RESOURCES:	Year: (* current)	1	2 *	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	15.9	15.6		31.5
	Salaries :	49.1	58.5		107.6
Budget	Total :	65.0	74.1		139.1
Source:RAC	Man Years :	2.2	2.3		4.5
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1935

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X Contract Solicited Date : May 26, 1987
INTERNAL Grant X Unsolicited X Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Syntheses of Oxygen and Sulphur PAHs of Interest in Environmental Pollution and Toxicology

PROJECT NO: 170G
START DATE: (m/yr): 08/84
RES. PRIORITY:

SHORT TITLE: Environmental Pollution

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator and Affiliation: E. Lee-Ruff, Department of Chemistry
York University

LIAISON OFFICER: (name, location, phone no.) O. Meresz - Laboratory Services Branch
235-5762

INTERNAL PROJECTS
Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To prepare polynuclear aromatic hydrocarbon compounds for use as chemical standards in the analysis of air particulate matter.

PROJECT DESCRIPTION: A method will be developed for the preparation of PAH, furans and related hazardous compounds. The method will be extended to the preparation of thiophenes and other chemicals suspected in emission sources from coal, municipal incineration and diesel engines.

BUDGET AND RESOURCES:	Year: (* current)	1	2	3 *	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	7.0	3.5	4.0	14.5
	Salaries :	6.0	6.5	6.5	19.0
Budget	Total :	13.0	10.0	10.5	33.5
Source:RAC	Man Years :	1.1	1.1	1.1	3.3
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Confs., 1985 and 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract X	Solicited	Date : May 28, 1987
INTERNAL	Grant	Unsolicited X	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Application of Taga 6000 Method in the Measurement of Dioxin and Furan Emissions at Municipal Solid Waste Incinerators

PROJECT NO: 177C
START DATE: (m/yr): 01/85
RES. PRIORITY:

SHORT TITLE: Taga Dioxins

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. B. Sushan SCIEX (Division of MDS Health Group Ltd.)
LIAISON OFFICER: (name, location, phone no.)	V. Ozvacic - Air Resources Branch 965-5770

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To assess cost effectiveness and practicality of a methodology to rapidly determine dioxins and furans at municipal solid waste incinerators.

PROJECT DESCRIPTION: Apply and validate an alternative method for analyzing PCDD and PCDF in fly ash and air emission samples and compare with conventional methods.

BUDGET AND RESOURCES:	Year: (* current)	1	2 *	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :	129.5	11.5		141.0
Source:RAC	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Confs., 1985 and 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract X	Solicited	Date : May 28, 1987
INTERNAL	Grant	Unsolicited X	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Applying New Technology For Defluoridation of Water Supply Systems

PROJECT NO: 180C
START DATE: (m/yr): 03/85
RES. PRIORITY:

SHORT TITLE: Defluoridation

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator and Affiliation: P.J. Halliday, Senior Process Chemist
Proctor & Redfern Group

LIAISON OFFICER: (name, location, phone no.) J. Dart - Water Resources Branch
323-4876

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): Review the literature and evaluate, on a pilot plant scale, the use of activated alumina for the removal of fluoride under various temperature, flow and regeneration conditions including reverse osmosis.

PROJECT DESCRIPTION: The study will 1) take American defluoridation of potable water supply data and extrapolate it on Canadian conditions of treatment and waste disposal;
2) carry out a literature review and limited on-site pilot tests on elevated-fluoride well water;
3) compare two treatment choices - an activated alumina bed and a reverse osmosis unit - in two-week long pilot tests;
4) Estimate design requirements and projected treatment costs from the trials to show the equivalent economics for the two options.

BUDGET AND RESOURCES:	Year: (* current)	1	2 *	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	5.0	13.0		18.0
	Salaries :				
Budget Source:RAC	Total :	5.0	13.0		18.0
	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1985

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X Contract Solicited Date : May 25, 1987
INTERNAL Grant X Unsolicited X Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Grit Removal at Sewage Treatment Plants Using a Low Pressure Hydrocyclone

PROJECT NO: 184G
START DATE: (m/yr): 06/85
RES. PRIORITY:

SHORT TITLE: Grit Removal

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. J.D. Boadway, Department of Civil Engineering Queen's University
LIAISON OFFICER: (name, location, phone no.)	H. Kronis - Water Resources Branch 323-4986

INTERNAL PROJECTS

Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To develop a low pressure and efficient hydrocyclone suitable for grit removal from raw sewage.

PROJECT DESCRIPTION: Hydrocyclones have long been used for grit removal in pulp and paper industry. The use of this technology for grit removal from sewage has been limited mainly due to the high pressure differentials used and the resulting energy cost.

In this project a low pressure laboratory-scale system will be developed and evaluated for grit removal from sewage. The resulting hydrocyclone design may then be used at sewage treatment plants.

BUDGET AND RESOURCES:	Year: (* current)	1	2 *	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	10.0	10.5		20.5
	Salaries :	6.5			6.5
Budget Source:RAC	Total :	16.5	10.5		27.0
	Man Years :				0.6
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X Contract Solicited **Date : May 25, 1987**
INTERNAL Grant X Unsolicited X **Revision: October 5, 1987**

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: In-Situ Assessment of Mixed Copper and Zinc Impacts on White Sucker (Catastomus commersoni) Populations in Several Northern Ontario Lakes: an Evaluation of the Environmental Health Assessment to Validating Water Quality Criteria

PROJECT NO: 193G & 331G
START DATE: (m/yr): 04/85
RES. PRIORITY:

SHORT TITLE: Copper & Zinc

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator and Affiliation: George Dixon, University of Waterloo

LIAISON OFFICER: (name, location, phone no.) C. Neville - Water Resources Branch 235-5799

INTERNAL PROJECTS
Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): This study represents an integrated field - laboratory program designed to determine the impacts of metal contamination on the white sucker populations of several lakes in the Manitouwadge district of Ontario. Metal effects will be assessed in terms of reproductive capacity, and survival of larval fish. The program will fulfill the stated research needs of the Ministry: 1) the development of in-situ and ecosystem indicators of water quality impairment, 2) validation of a water quality criteria - objective approach to limiting the detrimental effects of aquatic contaminants, 3) to determine the impacts on Manitouwadge lakes and 4) to fully evaluate difference in growth, larval survival and larval resistance to metals as well as provide information on additional lakes.

PROJECT DESCRIPTION: This study will follow seasonal changes in gonad development, serum steroid levels and gamete viability in white suckers sampled from lakes in the Manitouwadge chain representing low, moderate and elevated levels of copper and zinc contamination. The fish will also be examined for histopathological evidence of a reaction to the elevated metal levels. During the second phase of the project, fertilized gametes from representative lakes will be returned to the University of Waterloo and examined for abnormalities in development and/or growth. Simultaneous toxicity tests will determine the possibility of genetic input to altered relative metal tolerance.

In order to validate assessment models it is necessary to isolate and identify factors associated with the altered health of the white sucker populations. More information is required on the nutritional and energy status of the fish, maternal factors associated with increased metal tolerance and effects of cross-fertilization between lakes. This additional information will provide the strongest database for future comparisons of additional studies on ecosystem health in degraded environments.

BUDGET AND RESOURCES:	Year: (* current)	1	2	3 *	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	22.8	15.9	15.3	54.0
	Salaries :	16.0	16.0	22.9	54.9
Budget	Total :	38.8	31.9	38.2	108.9
Source:RAC	Man Years :	1.5	1.5	1.8	4.8
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports): Annual and semi-annual reports. Paper presented at Tech. Trans. Conf., 1986. Four papers prepared for publishing.

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: Approved for third year

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X Contract Solicited
INTERNAL Grant X Unsolicited X

Date : May 25, 1986
Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Multi-media Environmental and Human Exposure Assessment of Organic Contaminants

PROJECT NO: 194G
START DATE: (m/yr): 04/85
RES. PRIORITY:

SHORT TITLE: Organic Contaminants

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	D. Mackay, Department of Chemical Engineering & Applied Chemistry, University of Toronto
LIAISON OFFICER: (name, location, phone no.)	Jim Smith - Hazardous Contaminants Coordination Branch 323-5113

INTERNAL PROJECTS

Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. To develop the capability of predicting spatial variations of chemical concentrations of selected hazardous substances in the environment from known mean values;
2. To validate the statistical distributions with extensive monitoring data obtained for Southern Ontario;
3. Link these environmental concentrations with an exposure assessment model to determine total amounts available to human through air inhalation, diet and drinking water as an aid to identify the dominant exposure routes and developing integrated multi-media guidelines.

PROJECT DESCRIPTION: Various organic compounds of interest to the Ministry and for which Ontario monitoring data exist will be selected in consultation with the Ministry. Extensive monitoring and emission data for these substances will be gathered and fitted to a statistical distribution to determine the spatially heterogenous concentration distributions for these substances in various environmental phases such as air, water, sediment, soil, etc. on a regional basis. This capability will be combined with fugacity model to predict a range of concentrations rather than a single mean concentration for a compartment. ANTICIPATED RESULTS: The results will (i) validate and "calibrate" the fugacity model, thus providing a useful tool for the Ministry in assessing the behaviour of existing and new chemicals in the Ontario Environment, (ii) provide information about the most important routes by which humans are exposed to these chemcials, (iii) provide information on likely concentration levels of new and existing chemicals in the environments, thus improving the effectiveness of analytical monitoring programs.

BUDGET AND RESOURCES:	Year: (* current)	1	2	3 *	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	6.5	7.0	7.6	21.1
	Salaries :	30.4	31.9	33.4	95.7
Budget	Total :	36.9	38.9	41.0	116.8
Source:RAC	Man Years :	2.3	2.3	2.3	6.9
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Confs., 1984 and 1985

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	**Contract**	**Solicited**	**Date : May 25, 1987**
INTERNAL	**Grant X**	**Unsolicited X**	**Revision: October 5, 1987**

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Degradation of Organic Contaminants by Anaerobic Bacteria in Lake Ontario Sediments

PROJECT NO: 195G
START DATE: (m/yr): 06/85
RES. PRIORITY:

SHORT TITLE: Organics-Anaerobic Bacteria

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	**Dr. M. Goldner and Dr. C. Wyndman University of Toronto**
LIAISON OFFICER: (name, location, phone no.)	**Deo Persaud - Water Resources Branch 323-4926**

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. To determine whether anaerobic bacteria in Lake Ontario sediments can degrade xenobiotics (simple and more complex) using slurry enrichments and sediment/water cores. 2. To correlate breakdown rates with cell density in small cores from various locations on Lake Ontario. 3. To enrich, isolate and characterize bacteria in a degredative consortium. 4. To fit rates and bacterial counts to a model in order to predict, within limits, the fate of specific contaminants in situ.

PROJECT DESCRIPTION: The project addresses the problem of contaminant deposition in sediments by assessing the capability of indigenous anaerobes to degrade both simple and more complex man-made compounds. Slurry enrichments and sediment/water cores will be utilized to measure breakdown rates and bacterial densities. After statistical analysis these data will be fitted to a model, either one published or to be developed. Bacteria making up a degradative consortium will be enriched, isolated, and characterized by standard procedures carried out under stringent anaerobic conditions.

BUDGET AND RESOURCES:	**Year: (* current)**	**1**	**2**	**3 ***	**TOTAL**
EXTERNAL	**Cost: (000's)**				
PROJECTS	**Operating:**	**13.0**	**11.0**	**12.6**	**36.6**
	Salaries :	**18.9**	**20.0**	**19.3**	**58.2**
Budget	**Total :**	**31.9**	**31.0**	**31.9**	**94.8**
Source:RAC	**Man Years :**	**1.4**	**1.5**	**1.4**	**4.3**
INTERNAL	**Cost: (000's)**				
PROJECTS	**Operating:**				
	Salaries :				
Budget	**Total :**				
Source:	**Man Years :**				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: Principal investigator changed due to death of Dr. J. Hoeniger. An increase in project cost of $3500 was granted to cover additional equipment cost.

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : May 22, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Validation and a Possible Reassessment of Clam Caging Experiments using Elliptio Complanatus as Biomonitors for Toxic Contaminants in Water

PROJECT NO: 196G
START DATE: (m/yr): 04/85
RES. PRIORITY:

SHORT TITLE: Clam Caging

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. P. Hebert, Great Lakes Institute University of Windsor
LIAISON OFFICER: (name, location, phone no.)	Mr. Allan Hayton - Water Resources Branch 235-5803

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To assess the validity of using Elliptio Complanatus for monitoring water quality in the Great Lakes and to make recommendations on the use in situ populations of Lampsilis Radiata - a clam native to both the Great Lakes, rivers and other lakes in Ontario.

PROJECT DESCRIPTION: A series of field experiments will be carried out to provide answers to the following questions:
1) Does caging affect the amount or type of contaminant found in clam tissues?;
2) Is seasonal variation evident in the contaminant loads of native clams (L. Radiata) from a specific site, and are these patterns similar in male and female clams?;
3) How long does it take for clams moved from a "clean" environment to a contaminated site to accumulate the same contaminant load as native clams resident in the contaminated habitat?;
4) Conversely, how long does it take for clams transplanted from a "dirty" to a clean site to lose their contaminant loads?;
5) Does E. Complanatus work as well or better than "clean" L. radiata as a biomonitor?

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	6.6			6.6
	Salaries :	12.1			12.1
Budget Source:RAC	Total :	18.7			18.7
	Man Years :	0.9			0.9
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1985

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract	Solicited	Date : May 25, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Monitoring the Chemical and Biological Impact, as Measured by Physiological Stress in Fish, of Episodic Events of Acid Precipatation and Snow Melt

PROJECT NO: 197G
START DATE: (m/yr): 04/85
RES. PRIORITY:

SHORT TITLE: Acid Precip./Snowmelt

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. Harold H. Harvey, Professor of Zoology University of Toronto
LIAISON OFFICER: (name, location, phone no.)	Dr. P.J. Dillon - Dorset Research Centre (705) 766-2412

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To determine if the observed perturbations of fish populations in MOE calibrated lakes Crosson and Heney are related to the observed pH depressions in these lakes during episodic acid loading. To determine if the observed physiological stress and mortality of fish at Plastic Lake and Milford Bay occur in other waters susceptible to acidification. To use the resulting data in acid loading models and to relate specific acid loading events to both sources of SO_2 and NO_x, and to effects on the biota.

PROJECT DESCRIPTION: It is proposed that endemic white suckers and hatchery rainbow trout be held at several sites and depths in lakes Crosson and Heney. The fish will be monitored for stress by measuring blood and muscle ions at intervals, before, during and after acid pulses from rain and snow events. Water chemistry, including Al speciation, will be determined concurrently. Subsequently this in situ toxicity testing will be extended to other lakes in the Black River drainage which are supsceptible to acidification. The results will help to define how widespread are the Plastic Lake phenomena of fish kills and fish stress.

BUDGET AND RESOURCES:	Year: (* current)	1	2 *	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	6.0	6.7		12.7
	Salaries :	14.1	14.1		28.2
Budget	Total :	20.1	20.8		40.9
Source:RAC	Man Years :	1.2	1.2		2.4
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : May 25, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Humber River/Black Creek: Detailed Bacteriological Water Quality Study Examining the Impact of Sediment and Survival Times

PROJECT NO: 198G
START DATE: (m/yr): 04/85
RES. PRIORITY:

SHORT TITLE: Humber River/Black Creek

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. P. Seyfried, University of Toronto
LIAISON OFFICER: (name, location, phone no.)	Z. Novak - Water Resources Branch 323-4804

INTERNAL PROJECTS

Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1)To determine the extent of bacterial exchange between sediment and water as a result of resuspension of sediment.
2)To determine survival times of fecal indicator bacteria in the Humber River environment.
3)To provide information required for methods being developed for inferring original sources of fecal pollution by identifying bacteria present at study sites.
4)Determining loadings, potential for sediment transport and deposition capacity of different source types.

PROJECT DESCRIPTION: To examine loadings and the effect of sediment resuspension, samples will be obtained at, above and below 5 different source inputs for 2 different conditions - undistrubed and agitated sediments. Levels of all fecal indicator bacteria currently employed in surveys by the Ministry will be assessed as well as sediment content. Meteorological and flow conditions will also be determined.

To assist in the development of a method for tracing and identifying sources of fecal pollution fecal streptococci will be isolated and identified in conjuction with the above study. Information on populations present will be interpreted along with data currently being obtained on the fecal streptococcal populations in human and non-human feces.

Survival times of fecal indicator bacteria will be determined in environmental testing chambers designed for this purpose. Studies will be conducted in situ at each of the five locations.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	41.0			41.0
Budget	Salaries :	57.0			57.0
Source:RAC	Total :	98.0			98.0
	Man Years :	5.0			5.0
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
Budget	Salaries :				
Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: Final report under revision.

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : May 22, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Bioaccumulation of Mercury by Yellow Perch

PROJECT NO: 199G
START DATE: (m/yr): 04/85
RES. PRIORITY:

SHORT TITLE: Mercury in Perch

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. D.J. McQueen, Department of Biology York University
LIAISON OFFICER: (name, location, phone no.)	K. Suns - Water Resources Branch 235-5798

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To develop a model for the bioaccumulation of mercury in young-of-the-year yellow perch. The model will be used to explain inter-lake variation in mercury body burdens.

PROJECT DESCRIPTION: Three Precambrian Shield lakes in the Dorset area will be sampled to obtain: 1) the data required to develop a mercury bioaccumulation model; 2) seasonal data on net accumulation of mercury by yellow perch through their first year of life.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	21.3			21.3
	Salaries :	7.7			7.7
Budget	Total :	29.0			29.0
Source:RAC	Man Years :	0.7			0.7
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract	Solicited	Date : May 26, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: PAH Analysis of Environmental Samples at Low Temperature using Fluorescence Detection

PROJECT NO: 200G
START DATE: (m/yr): 04/85
RES. PRIORITY:

SHORT TITLE: PAH Analysis

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Drs. S.V. Filseth, F.J. Morgan, and C.M. Sadowski Faculty of Science, York University
LIAISON OFFICER: (name, location, phone no.)	G. Crawford - Laboratory Service Branch 235-5757

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To develop a method for PAH Analysis of environmental samples by low Temperature Fluorescence Spectroscopy, and to examine the utility of Shpol'skii Spectroscopy for computer based data acquisition and processing in order to identify a selected group of PAH compounds.

PROJECT DESCRIPTION: Environmental samples will be examined after the different preparatory stages currently required for analysis. Shpol'skii Spectroscopy using a narrow spectral band laser as an excitation source will be used to identify a selected group of carcinogenic PAHs. Additionally, the suitability of Shpol'skii Spectroscopy for computer-based data acquisition and processing will be examined in order to identify a selected group of PAH compounds.

BUDGET AND RESOURCES:	Year: (* current)	1	2	3 *	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	14.9	9.1	11.4	35.4
	Salaries :	7.0	7.6	8.2	22.8
Budget Source:RAC	Total :	21.9	16.7	19.6	58.2
	Man Years :	2.2	2.2	2.2	6.6
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Confs., 1985 and 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: Additional funding in the amount of $10,000 was granted for the purchase of laser equipment.

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract	Solicited	Date : May 25, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Estimation of Ambient Water Qualities in Ontario Rivers to Identify and Manage Potential Water Quality Problems

PROJECT NO: 201G
START DATE: (m/yr): 07/85
RES. PRIORITY:

SHORT TITLE: Water Quality

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Dr. T.E. Unny,
University of Waterloo

LIAISON OFFICER: (name, location, phone no.) Dr. Lloyd Logan - Water Resources Branch
323-4984

INTERNAL PROJECTS

Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To quantify, on the basis of historical record, the uncertanties in water quality parameters in Ontario rivers and to develop a basis to assess the effect of variations of these parameters on decision-making with regard to protection against risk to the environment due to stream degradations.

PROJECT DESCRIPTION:

- quantify existing ambient quality data
- derive probability distributions of selected parameters
- develop statistical trend approaches
- derive uncertainty trends in relation to potential water quality problems
- develop concise stochastic models to represent current loadings and effects from management generated scenarios
- test the derived models

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	7.5			7.5
	Salaries :	20.0			20.0
Budget	Total :	27.5			27.5
Source:RAC	Man Years :				
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports): Report, 1986; Paper presented at CCIW Workshop, 1985; Paper presented at Tech. Trans. Conf., 1986; Paper presented at PAHS Symposium 1987

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract X	Solicited	Date : May 28, 1987
INTERNAL	Grant	Unsolicited X	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: A Full Scale Study of the Effect of Wastewater Variable on the Efficacy of Ultraviolet Disinfection

PROJECT NO: 202C
START DATE: (m/yr): 07/85
RES. PRIORITY:

SHORT TITLE: UV Disinfection

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. G.E. Whitby Trojan Technologies Inc.
LIAISON OFFICER: (name, location, phone no.)	G. Palmateer - MOE (SW Region) (519) 661-2600

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To create a better understanding of the UV disinfection process at the full scale level by: a) reduction of UV transmission of effluent, b) reduction of effluent quality with primary and secondary solids, c) determination of photoreactivation and dark reactivity in situ, d) determination of efficiency of disinfection at mid-point and end-point of lamp life, e) determination of correlation between bacteriophage and E. coli; f) lamp output versus sensor response, and g) mathematical modelling versus measured parameters.

PROJECT DESCRIPTION: A full scale UV system will be subjected to a series of test situations which will provide the data for the above objectives. The test situations will include such parameters as reduced UV transmission, high suspended solids and different types of effluents. Various indicator organisms and pathogens will be enumerated before and after photoreactivation. Mathematical models will be examined.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	40.8			40.8
	Salaries :	32.9			32.9
Budget Source:RAC	Total :	73.7			73.7
	Man Years :	1.1			1.1
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports): American Soc. Mircrobiology (Altantic, Georgia, 1987).; Water Pollution Control Federation Conference - Virginia, New England, Utah, Illnois, 1986.

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : May 25, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Effects of Rural and Suburban Development on Surface Water Quality in Five Selected Subwatersheds in The Upper Humber River

PROJECT NO: 203G
START DATE: (m/yr): 07/85
RES. PRIORITY:

SHORT TITLE: Upper Humber Waste Quality

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Brian Hindley, Project Biologist Metropolitan Toronto & Region Conservation Authority
LIAISON OFFICER: (name, location, phone no.)	K. Willson - Water Resources Branch 323-4820

INTERNAL PROJECTS

Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. To estimate sediment volumes and pollutant loadings from a forested, undisturbed watershed; an urban construction site; rural cultivated lands and stream bank erosion.

2. To estimate bacterial and suspended sediment loadings and the degree of water quality impairment to a stream from unrestricted livestock access.

PROJECT DESCRIPTION: Water and sediment sampling stations will be established on several small tributaries of the Humber River to investigate pollutant loadings from the above land use problems. Contributions to instream water quality impairment will be assessed relative to Provincial Water Quality Objectives.

BUDGET AND RESOURCES:	Year: (* current)	1	2 *	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	50.0	15.0		65.0
	Salaries :	56.3			56.3
Budget	Total :	106.3	15.0		121.3
Source:RAC	Man Years :	2.7	0.7		3.4
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract X	Solicited	Date : 01/06/87
INTERNAL	Grant	Unsolicited X	Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Proposal to prepare a case history of cheese whey concentration by reverse osmosis

PROJECT NO: 204C
START DATE: (m/yr): 16/01/86
RES. PRIORITY:

SHORT TITLE: Reverse Osmosis

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator and Affiliation: F.A. Tonelli, Vice-President, Zenon Environmental Inc.

LIAISON OFFICER: (name, location, phone no.) Walter Suboch - Water Resources Branch 323-4884

INTERNAL PROJECTS
Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. To document the background leading to the application of osmosis technology for concentration of cheese whey for cattle feed.
2. To observe and monitor the process in operation at a Canadian cheese plant, in terms of process efficiency and environmental compliance.
3. To provide a technical, environmental, and economic evaluation of the process and equipment utilized and make recommendations for design and operating practices at a new installation of similar scale.

PROJECT DESCRIPTION: Background information necessary to evaluate reverse osmosis technology will be collected. Environmental regulations and programs relevant to pollution abatement caused by whey, and samples of feed, concentrate and permeate will be collected and analyzed for operational parameters.

Final evaluation of the method will include technical and economic efficiency as well as the degree of compliance with environmental requirements.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	16.6			16.6
	Salaries :	7.3			7.3
Budget Source:RAC	Total :	23.9			23.9
	Man Years :	0.3			0.3
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract X	Solicited	Date : May 28, 1987
INNTERNAL	Grant	Unsolicited X	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Evaluation of Native Marsh Plant Species for Treatment of Domestic Sewage

PROJECT NO: 205C
START DATE: (m/yr): 10/85
RES. PRIORITY:

SHORT TITLE: Marsh Evaluation

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	John H. Neil, President Limnos Ltd.
LIAISON OFFICER: (name, location, phone no.)	D. Snell - Water Resources Branch 235-5822

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1) Review of literature pertaining to the use of alternative marsh species for sewage treatment, the establishment of cells for the comparison of three native species, to develop cultural practice for scale-up and to predict the treatment capability of a fully operating system.
2) To evaluate capacity of duckweed species for removal of ammonia from secondary effluents.

PROJECT DESCRIPTION: 1. Experimental cells will be developed and designated marsh species to be planted under controlled conditions.
2. Implementation of monitoring program.
3. Evaluation of the efficiency of treatment for each developed cell.

The project will provide the Ministry with information on the efficacy of marsh treatment of domestic sewage.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	23.5			23.5
	Salaries :	37.7			37.7
Budget	Total :	61.2			61.2
Source:RAC	Man Years :	0.9			0.9
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : June 2, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Screening Methods for Air and Water Samples: Application of Inductively Coupled Plasma Mass Spectrometry (ICP/MS) to Elemental Analysis

PROJECT NO: 207G
START DATE: (m/yr): 06/85
RES. PRIORITY:

SHORT TITLE: Screening Methods ICP

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Drs. J.B. French (UTIAS) and Jon C. Van Loon (IES) University of Toronto

LIAISON OFFICER: (name, location, phone no.) D. Boomer - Laboratory Services Branch 235-5858

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. To develop ICP/MS methods for multielement analyses of solid and liquid environmental materials.
2. To develop ICP/MS as detector for liquid and gas chromatography columns to determine the chemical form of metals.
3. To extend above to include isotopic ratio studies
4. To verify the developed methods

PROJECT DESCRIPTION: An electrothermal atomizer will be developed for direct sample introduction into the ICP/Mass Spectroscopy System.
The developed methods for the analyses of gas or liquid chromatographic effluents would allow for the determination of the chemical form of toxic metals in air and water samples. The methods will further be extended to allow for the determination of isotopic ratios. The developed methods and technologies will be transferred for use in MOE laboratory.

BUDGET AND RESOURCES:	Year: (* current)	1	2	3 *	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :	45.0	45.0	45.0	135.0
Source:RAC	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X Contract Solicited Date : May 26, 1987
INTERNAL Grant X Unsolicited X Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Waste Management Planning for Pharmaceutical Industry

PROJECT NO: 209G
START DATE: (m/yr): 11/85
RES. PRIORITY:

SHORT TITLE: Pharmaceutical Industry

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Dr. Robert A. Stairs, Errol G. Lewars and R. Makeja
Department of Chemistry, Trent University

LIAISON OFFICER: (name, location, phone no.) J. Manuel - Waste Management Branch
323-5125

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. To assess present practice and regulations, types and quantities of pharmaceutical wastes, storage, handling and disposal.
2. To recommend changes in practice or regulations, as appropriate. To promote occupational and environmental safety and to effect economies, if possible.

PROJECT DESCRIPTION: By consultation (with industry, Ministry and OWMC personnel), by questionnaire and on-site visits, data will be collected on nature, quantities, hazards to workers or environment, of all wastes generated by pharmaceutical manufacturing. This will include process wastes as well as unwanted products. Current procedures and facilities will be assessed, and desirable changes considered in the light of current or proposed regulations.

BUDGET AND RESOURCES:	Year: (* current)	1	2	3 *	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	2.4	2.2	2.4	7.0
	Salaries :	16.6	16.6	10.6	43.8
Budget	Total :	19.0	18.8	13.0	50.8
Source:RAC	Man Years :	1.9	1.9	1.2	5.0
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Confs., 1985, 1986, and 1987

EXTERNAL PARTICIPATION (ministries, governments, agencies):
OWMC

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract X	Solicited	Date : May 29, 1987
INTERNAL	Grant	Unsolicited X	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: To Develop the GC/MED System as Non GC/MS Screening Technique

PROJECT NO: 211C
START DATE: (m/yr): 04/86
RES. PRIORITY:

SHORT TITLE: G.C./Med. System

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. Lucy Danylewych-May Barringer Magenta Limited
LIAISON OFFICER: (name, location, phone no.)	Patricia Baulu - Laboratory Services Branch 235-5753

INTERNAL PROJECTS

Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To assess the GC/MED analytical system as a non GC/MS technique for the determination of C, Cl, Br, F, P, and S in hazardous waste and its application for the analysis of volatile and non-volatile contaminants.

PROJECT DESCRIPTION: In this phase of a broader study, the MED system will be developed and optimized to meet MOE requirements for the analysis of hazardous wastes.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	7.0			7.0
	Salaries :	56.0			56.0
Budget Source:RAC	Total :	63.0			63.0
	Man Years :	1.6			1.6
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: Project has been extended until October 1987 as requested by Barringer.

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X Contract Solicited Date : May 26, 1987
INTERNAL Grant X Unsolicited X Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Monitoring Environmental Genotoxicity Using Sister Chromatid Exchanges in Mice

PROJECT NO: 212G
START DATE: (m/yr): 07/85
RES. PRIORITY:

SHORT TITLE: Environmental Genotoxicity

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Dr. Michael L. Petras, Department of Biology, University of Windsor

LIAISON OFFICER: (name, location, phone no.) Dr. N. Salamone - Water Resources Branch 235-5790

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To continue evaluating the feasibility of using sister chromatid exchanges (SCE) in both wild and inbred (laboratory) mice as a first-line monitoring system for environmental genotoxicity. Such a system could use either animals that are already in place (natural pollution) or mice that are placed in corn-filled containers at sites to be monitored.

PROJECT DESCRIPTION: The basic approach involves comparing SCE levels in mice that have been exposed to a particular environment with SCE levels in control mice. If a genotoxin is present in the environment being studied, the SCE level will exceed that seen in the controls. The specific objectives of this phase include:

1. The effect of a crisis situation (high genotoxic level) on SCE counts;
2. The effects of the modes of administration of several encountered genotoxins;
3. The duration of genotoxic effect after exposure to an agent;
4. The variability of response in wild mice to several known mutagens;
5. Procedures to enhance the sensitivity of the SCE technique.

BUDGET AND RESOURCES:	Year: (* current)	1	2	3 *	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	14.7	27.9	28.3	70.9
	Salaries :	18.0	19.0	20.0	57.0
Budget	Total :	32.7	46.9	48.3	127.9
Source:RAC	Man Years :				
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Confs., 1985 and 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : May 26, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Effect of Increasing Amounts of Non-Polar Organic Liquids in Domestic Waste Leachate on the Hydroaulic Conductivity of Clay Liners in Southern Ontario

PROJECT NO: 213G
STAKT DATE: (m/yr): 08/85
RES. PRIORITY:

SHORT TITLE: Waste Leachate

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. R.M. Quigley, Faculty of Engineering Science University of Western Ontario
LIAISON OFFICER: (name, location, phone no.)	M. Goodwin - Waste Management Branch 323-5217

INTERNAL PROJECTS

Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To determine the threshold concentrations of selected, non-polar, low dielectric liquid hydrocarbons added to domestic waste leachate, at which large increases in hydraulic conductivity of natural and/or compacted clay barriers would occur.

PROJECT DESCRIPTION: Raw domestic waste leachate, contaminated with added liquid hydrocarbons and methanol as an association liquid, will be passed through clay samples at high gradients and constant flow rates. A new computer-controlled fixed ring permeameter system will be used for the measurement of k versus pore volumes passed through. Chemical control of the influent and effluent liquids will be maintained by gas chromatograph and AA equipment. Selected industrial wastes will also be passed through the samples. Weathered brown clays from the Sarnia area will be the test soils.

BUDGET AND RESOURCES:	Year: (* current)	1	2 *	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	5.0	5.0		10.0
Budget	Salaries :	19.0	19.0		38.0
Source:RAC	Total :	24.0	24.0		48.0
	Man Years :	1.4	1.4		2.8
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
Budget	Salaries :				
Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports): "Effect of Viscosity on the Hydraulic Conductiviy of Clayey Soils Permeated with Water Soluble Organics" - F. Fernandez; R.M. Quigley; 40th Canadian Geotechnical Conference, Regina, October 1987. Paper presented at Tech. Trans. Conf., 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X Contract Solicited
INTERNAL Grant X Unsolicited X

Date : May 26, 1987
Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Evaluation of Contaminant Velocity Groundwater in low-permeability Fractured Shale

PROJECT NO: 214G
START DATE: (m/yr): 08/85
RES. PRIORITY:

SHORT TITLE: Fractured Shale

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Drs. J. Cherry and Ed Sudicki, Institute for Groundwater Research, University of Waterloo

LIAISON OFFICER: (name, location, phone no.) A. Scott - Waste Management Branch 323-5218

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To evaluate several methods for determining the average velocity of non-reactive contaminants in shale of low permeability, to assess the velocity and matrix diffusion effects in low permeability, but probably high velocity zones in the Queenston shale, and to determine how long it will take for contaminants to migrate from landfills in the Burlington-Hamilton area to Lake Ontario.

PROJECT DESCRIPTION: The study will consist primarily of field tests at two or three locations on fractured Queenston shale in the vicinity of the Bayview Park landfill or the nearby Burlington landfill. The test sites will be instrumented with a network of cored holes, multilevel piezometers and wells. Hydraulic tests will be conducted to determine the effective bulk fracture porosity of the shale so that the Darcy equation can be used to obtain estimated values of average contaminant transport velocity under natural gradients. Borehold dilution tests will be done to determine velocity values in single boreholes. The test sites will be in zones of low permeability so that the hypothesis of high contaminant velocity in low permeability zones can be evaluated.

BUDGET AND RESOURCES:	Year: (* current)	1	2	3 *	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	19.2	19.2	10.6	49.0
	Salaries :	14.5	14.5	12.0	41.0
Budget	Total :	33.7	33.7	22.6	90.0
Source:RAC	Man Years :	1.0	1.0	0.8	2.8
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract X	Solicited	Date : May 27, 1987
INTERNAL	Grant	Unsolicited X	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Biological Indicator System to Identify Genotoxicity of In-Place Pollutants

PROJECT NO: 215C
START DATE: (m/yr): 01/86
RES. PRIORITY:

SHORT TITLE: Biological Indicator

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. J. Fitchko, Manager IEC Beak Consultants Ltd.
LIAISON OFFICER: (name, location, phone no.)	J. Ralston - Water Resources Branch 323-4924

INTERNAL PROJECTS

Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To develop a reliabe biological indicator test system to evaluate the biological effects-genotoxicity of in-place pollutants on chiroronomids.

PROJECT DESCRIPTION: A biological indicator test system will be further developed and evaluated using Chiroronomids collected at polluted and non-polluted waters.

Deformity evaluation for Chiroronomids from sources not affected by radionuclides will be carried out to substantiate that deformity response is chemically induces.

This project is phase 1 of a broader proposal.

BUDGET AND RESOURCES:	Year: (* current)	1	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	1.7			1.7
	Salaries :	8.3			8.3
Budget	Total :	10.0			10.0
Source:RAC	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):
Additional cost covered by IEC Beak

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract X	Solicited	Date : May 28, 1987
INTERNAL	Grant	Unsolicited X	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Development of Guidelines to Control the Disposal of Wates as Backfill Material in Ontario

PROJECT NO: 217C
START DATE: (m/yr): 09/85
RES. PRIORITY:

SHORT TITLE: Waste Disposal

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Richard J. Rush, Vice President & Senior Project Manager Canviro Consultants Ltd.
LIAISON OFFICER: (name, location, phone no.)	D. Hickman - Waste Management Branch 323-5206

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. Review of guidelines related to backfill of wastes.
2. To prepare an inventory of major industrial sources of inert fill material and to describe leachate characteristics.
3. Development of a process for the classification of inert fill material.
4. Development of a preliminary set of criteria for backfill applications.

PROJECT DESCRIPTION: This study includes a survey of wastes used for backfill in Ontario and a review of current practices in Ontario and any existing guidelines of other jurisdictions in order to develop new guidelines for use by the Ministry in support of the implementation of Regulation 309.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	2.0			2.0
	Salaries :	24.9			24.9
Budget	Total :	26.9			26.9
Source:RAC	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : May 26, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Sewage Sludge Compost as Turf Fertilizer

PROJECT NO: 218G
START DATE: (m/yr): 08/85
RES. PRIORITY:

SHORT TITLE: Turf Fertilizer

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. J.L. Eggens, Department of Horticultural Science University of Guelph
LIAISON OFFICER: (name, location, phone no.)	N. Ahlberg - Waste Management Branch 323-5189

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To evaluate the usefulness of sewage sludge compost as a replacement to milorganite as a fertilizer for golf course fairways as well as for other applications (home lawns, athletic fields, sod farms, etc.)

PROJECT DESCRIPTION: Laboratory and field work will be carried out to observe the influence of the compost on wear tolerance, environmental stress, disease, recuperative potential, thatch accumulation and playing quality of high maintenance heavily used turf.

Successful completion of the project will provide a commercial sewage sludge fertilizer that would replace Milorganite in the marketplace. Minor nutrient formulation amendments may be necessary.

BUDGET AND RESOURCES:	Year: (* current)	1	2 *	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	6.9	7.1	7.6	21.6
Budget	Salaries :	15.5	16.2	17.0	48.7
Source:RAC	Total :	22.4	23.3	24.6	70.3
	Man Years :	2.0	2.0	2.0	6.0
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
Budget	Salaries :				
Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : May 26, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Dose Response for Selected Environmental Air Pollution on Selected Populations

PROJECT NO: 219G
START DATE: (m/yr): 10/85
RES. PRIORITY:

SHORT TITLE: Dose Response of Air Pollution

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Frances Silverman, R.J. Shephard and P. Corey
University of Toronto

LIAISON OFFICER: (name, location, phone no.) W. Chan - Air Resources Branch
965-4081

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To examine effects of ambient urban air pollution on cardiorespiratory health and exercise performance in runners by: a) Establishing if a difference exists between 1) stationary monitoring at a central downtown station, 2) stationary monitoring at the running route, and 3) mobile site monitoring to approximate personal exposure; b) Establishing if an impairment in pulmonary function and exercise performance, an increased COHb% or increase in respiratory symptoms occur due to exposure; c) Evaluating by multiple regression analysis any such changes with the level of pollutants for each of the monitoring sites; d) Relating sensitivity to pollutants as measured by the multiple regression coefficients to general health effects (sick days, symptoms, performance times in races).

PROJECT DESCRIPTION: Subjects will be selected from the Longboat Road Runners Club and followed during weekly training runs and selected races. Measurements include: pulmonary function and carboxyhaemoglobin (COHb) measured before and after running, performance, subjective evaluations, symptoms, sick days, doctor visits, hospital days and an updated version of the Cornell Medical Index will be applied. Pollutants measured will include sulphur dioxide, nitrogen dioxide, ozone, CO and inhalable particulate matter, etc. along with environmental covariates (temperature, humidity, wind velocity, etc.) for each training run. Existing central station monitoring will be supplemented by the Gage samplers (for sulphur dioxide, nitrogen dioxide and particulate matter) placed at the central station at the starting location of the running routes and carried bicycles following alongside the runners. Statistical comparisons include pollutant type (nitrogen dioxide, sulphur dioxide, etc.), pulmonary function, COHb and performance changes, and differences attributable to methods, types, and locale of pollutant monitoring.

BUDGET AND RESOURCES:	Year: (* current)	1	2 *	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :	69.0	60.0	40.0	169.0
Source:RAC	Man Years :				
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):
Poster paper at TTC, 1987

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : May 26, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Mutagenicity of Complex Mixtures of Polycyclic Aromatic Hydrocarbons in Ambient Air Particulate Matters (APM)

PROJECT NO: 220G
START DATE: (m/yr): 10/85
RES. PRIORITY:

SHORT TITLE: Mutagenicity of PAH

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Dr. J.A. Heddle
York University

LIAISON OFFICER: (name, location, phone no.) Dr. G. Diamond - Air Resources Branch
965-4081

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To study mutagenic and carcinogenic potential of polyaromatic hydrocarbons in ambient air particulate matter and to determine the hazard and mutagenic risk of their mixture.

PROJECT DESCRIPTION: Mixtures of PAH's will be extracted from air particulate matter and subsequently tested for mutagenic activity. The findings will be compared with those on US-NBS standard material as well as with individual PAH mutagenicity data.

The results will be used to assess the effects and mechanisms of PAH's on the enzyme system and will provide the Ministry with new knowledge in the activity, toxicity, and dose-response relationships of chemical mutagens.

BUDGET AND RESOURCES:	Year: (* current)	1	2 *	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	23.5	23.5		47.0
	Salaries :	80.3	80.3		160.6
Budget Source:RAC	Total :	103.8	103.8		207.6
	Man Years :	3.4	3.4		6.8
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Confs., 1985 and 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL Contract X Solicited Date : May 28, 1987
INTERNAL X Grant Unsolicited Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Building Wake Study at Darlington

PROJECT NO: 221C
START DATE: (m/yr): 04/86
RES. PRIORITY:

SHORT TITLE: Darlington Bldg. Wake

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator
and Affiliation:

LIAISON OFFICER:
(name, location, phone no.)

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)	H. Sahota - Air Resources Branch 235-5764
SUPERVISOR:	Dr. P.K. Misra

OBJECTIVE(S): To study the effects of building wake on the dispersion characteristics of any pollutant released from the building.

PROJECT DESCRIPTION: Dispersion of hazardous contaminants data will be investigated and used to establish a reliable air pollution model. Air samples will be collected on an hourly basis, analyzed, and the findings will be correlated to meteorological information.

This study will be carried out in cooperation with Ontario Hydro with cost sharing between Air Resources Branch and Ontario Hydro.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				
INTERNAL	Cost: (000's)				
PROJECTS	Operating:	29.0			29.0
	Salaries :	15.0			15.0
Budget	Total :	44.0			44.0
Source:RAC	Man Years :	0.8			0.8

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc,).

EXTERNAL X	Contract X	Solicited X	Date : May 29, 1987
INTERNAL	Grant	Unsolicited	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Application of Robotics to the Analysis of Trace Organics

PROJECT NO: 223C
START DATE: (m/yr): 01/86
RES. PRIORITY:

SHORT TITLE: Robotics

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Ms. Cecilia Chau Mann Testing Laboratories Ltd.
LIAISON OFFICER: (name, location, phone no.)	G. Crawford - Laboratory Services Branch 235-5757

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To design, test and deliver a robotics system to provide fully automated sample preparation of fish and biological tissues prior to analysis for trace organics.

PROJECT DESCRIPTION: The consultant will study MOE's current manual extraction and concentration methods for fish and will plan the hardware and software necessary to carry out the weighing, transfer, dissolution, extraction, extract isolation and steps necessary to provide a trace organics solvent extract prior to cleanup. The consultant will acquire appropriate hardware (modifying if necessary), computer controller etc. Will write and debug the necessary computer control software, will assemble and test the system on fish samples, in parallel with MOE analysis of split aliquots. Acceptance will be based on comparative performance of manual and robotic system.

The consultant will deliver and set up the system at MOE labs and will ensure it to be operational, and train MOE staff in its operation.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	119.5			119.5
	Salaries :	50.5			50.5
Budget	Total :	170.0			170.0
Source:RAC	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract X	Solicited X	Date : May 29, 1986
INTERNAL	Grant	Unsolicited	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Development and Validation of a Methodology for Assessing the Relative Environmental Hazards of Chemical Contaminants

PROJECT NO: 226C
START DATE: (m/yr): 08/85
RES. PRIORITY:

SHORT TITLE: Screening Methods

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Cantox Inc.

LIAISON OFFICER: (name, location, phone no.) J. Smith - Hazardous Contaminant Coordination Branch 323-5113

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): - to provide an operational, peer-reviewed risk identification methodology for standard setting
- to provide assessment criteria to evaluate the hazards of chemicals selected by HCCB, ARB, WMB, WRB and Regions
- to define the information gathering process for assessing the hazards of individual chemicals

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PROJECT DESCRIPTION: This project represents the cornerstone of MOE's multi-media standard setting process. A tiered screening system for the identification and assessment of chemicals will be developed. Those chemcials of greatest concern will be screened at successive stages using more detailed information sources and more comprehensive criteria. Substances would be evaluated in terms of both their effects and exposure potential in Ontario. The magnitude of the exposure and the degree of the effects will be used to determine a concern level - high, medium, or low. The adequacy of the information upon which the concern is based will be used in establishing a confidence level - high, medium or low. Together, the parameters of concern and confidence will determine the relative priority for standard setting or other environmental management action based on the hazard of the substance. Thirty-two selected substances will be used to validate the methodology.

BUDGET AND RESOURCES:	Year: (* current)	1	2 *	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget Source:RAC	Total :	100.0	100.0		200.0
	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : May 22, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 19, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Contributions to the Understanding of the Sulphur Cycle in the Dorset Watershed

PROJECT NO: 228G
START DATE: (m/yr): 03/86
RES. PRIORITY:

SHORT TITLE: Sulphur Cycle

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. P. Fritz, Department of Earth Sciences University of Waterloo
LIAISON OFFICER: (name, location, phone no.)	Dr. P. Dillon - Water Resources Branch (Dorset) (705) 766-2412

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): The sulphur cycle in watersheds is initiated by fallout which subsequently interacts with the ecosystem in the soil and unsaturated zone. This portion of the cycle will be investigated with the aim to obtain information on the degree and/or type of precipitation of fallout sulphur in bio-geochemical reactions.

PROJECT DESCRIPTION: An intensive sampling and monitoring program of fallout, soil unsaturated zone, shallow groundwater and local runoff will be undertaken in at least two Dorset Watersheds (to be decided in collaboration with local research staff). Environmental isotope and chemical analyses will be done on sulfate and reduced sulfur from these environments. Samples collected will include 1) runoff and seeps from various precipitation counts, 2) continuous sampling of rainfall (designed for and "operated" by MOE personnel), 3) soil samples from a number of soil pits, 4) water soluble, exchangeable and total sulfur samples, separated from the soil samples and 5) water samples from the unsaturated zone and shallow groundwaters. Wherever possible this program will take advantage of ongoing studies to avoid duplication and to minimize sampling costs. Analyses will include 18_O and 2_H determinations on water, 13_C on dissolved inorganic carbon as well as 34_S and 18_O in sulfate from the various components.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	20.3			20.3
	Salaries :	6.0			6.0
Budget	Total :	26.3			26.3
Source:RAC	Man Years :	1.9			1.9
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X **Contract X** **Solicited** **Date : May 28, 1987**
INTERNAL **Grant** **Unsolicited X** **Revision: October 5, 1987**

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: The Feasibility of Biomass Removal in Shallow Impoundments as a Means of Reducing Nutrient Loading

PROJECT NO: 229C
START DATE: (m/yr): 11/85
RES. PRIORITY:

SHORT TITLE: Biomass Removal

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	**K. Clarke-Whistler, J. Fitchko (Beak) and G. Gespardy (CVCA)** **Beak Consultant Ltd. and Credit Valley Conservation Authority**
LIAISON OFFICER: **(name, location, phone no.)**	**Ken Nicholls - Water Resources Branch** **235-5810**

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. To determine the potential of biomass harvesting as a means of reducing nutrient loading from the Orangeville Reservoir to the Upper Credit River.
2. To identify nutrient input/output sources on a seasonal basis.

PROJECT DESCRIPTION: Nutrient inputs/outputs to and from the Orangeville Resevoir will be monitored for a full hydrological cycle. The nutrient load contained within vegetation and the water column of the reservoir will be determined on a seasonal basis.
The percent of the total nutrient load removed via biomass harvesting will be determined, and a site-specific nutrient budget developed.

Anticipated Results: Aquatic vegetation is a major source of nutrients to downstream receiving systems, and biomass removal may prove to be an effective means of controlling nutrient loadings.

BUDGET AND RESOURCES:	**Year: (* current)**	**1 ***	**2**	**3**	**TOTAL**
EXTERNAL	**Cost: (000's)**				
PROJECTS	**Operating:**	**11.1**			**11.1**
	Salaries :	**14.9**			**14.9**
Budget	**Total :**	**26.0**			**26.0**
Source:RAC	**Man Years :**	**0.3**			**0.3**
INTERNAL	**Cost: (000's)**				
PROJECTS	**Operating:**				
	Salaries :				
Budget	**Total :**				
Source:	**Man Years :**				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : May 26, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Development of an Ultrasonic Nebulizer for Stable and Reproductive Production of Aerosols for Atomic Spectrometric Analysis

PROJECT NO: 230G
START DATE: (m/yr): 10/85
RES. PRIORITY:

SHORT TITLE: Ultrasonic Nebulizations

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Dr. Jon C. Van Loon, Institute of Environmental Studies University of Toronto

LIAISON OFFICER: (name, location, phone no.) D. Boomer - Laboratory Services Branch 235-5858

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): - To develop an inexpensive but reliable ultrasonic nebulizer system.
- To evaluate this device using AAS, ICP/AES and ICP/MS*.
- To transfer the technology to MOE.

* AAS-Atomic Absorption Spectrometry ICP/MS-Inductively Coupled Plasma/Mass Spectrometry
ICP/AES-Inductively Coupled Plasma Atomic Emission Spectrometry

PROJECT DESCRIPTION: A transducer/power supply system from a domestic ultrasonic humidifier has been used. The power supply has been modified for stability and proper impedance matching. Use of a coating directly on the transducer plate surface (compared to a bonded plate) is being investigated.

BUDGET AND RESOURCES:	Year: (* current)	1	2 *	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	8.1	10.2		18.3
Budget Source:RAC	Salaries :	6.1	6.6		12.7
	Total :	14.2	16.8		31.0
	Man Years :				1.1
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
Budget Source:	Salaries :				
	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports): Paper presented at Tech. Trans. Conf., 1986
The report was used to fulfill the requirements for an M.Sc.

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: The final report has been received. The Report Approval Form is expected shortly from the Liaison Officer.

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract X	Solicited	Date : May 27, 1987
INTERNAL	Grant	Unsolicited X	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Development of a Standard Clam Biomonitoring Methodology for the Detection of Trace Contaminants Within Waters of the Ontario Great Lakes Region

PROJECT NO: 231C
START DATE: (m/yr): 05/86
RES. PRIORITY:

SHORT TITLE: Clam Biomonitoring

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	A. Melkic, President Integrated Explorations
LIAISON OFFICER: (name, location, phone no.)	A. Hayton - Water Resources Branch 235-5803

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S):
1. Assess the adequacy of supplies of uncontaminated clams.
2. Seek sources of alternative species from varied environments.

PROJECT DESCRIPTION:
1. Evaluate standing stocks in Balsam Lake
2. Explore other lakes for additional sources of various clam species

Anticipated Results:
- Standing stock, size distribution and spatial extent of presently used clam bed.
- Location of other clam beds within Balsam Lake.
- New sources of clams outside of Balsam Lake.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	42.0			42.0
	Salaries :	9.5			9.5
Budget	Total :	51.5			51.5
Source:RAC	Man Years :				
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X Contract X Solicited
INTERNAL Grant Unsolicited X

Date : May 28, 1987
Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Determining Sulphur Dioxide Mass Emission Fluxes by Stack Scanning: Phase II

PROJECT NO: 232C
START DATE: (m/yr): 10/85
RES. PRIORITY:

SHORT TITLE: Sulphur Dioxide Stack Scanning

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	R.C. Mitchner, Applications Engineer Moniteq Limited
LIAISON OFFICER: (name, location, phone no.)	D. Maftei - Air Resources Branch 965-5776

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To continue the initial investigation into determining sulphur dioxide concentrations in stack exhausts by remote scanning from a fixed platform. To evaluate the performance of the sensor in this configuration and identify the important operational parameters. Recommendations on its use as an operational tool will be presented.

PROJECT DESCRIPTION: (i) Modify the sensor to optimize its performance in this configuration.
(ii) Manufacture a scanning platform
(iii) Conduct a series of laboratory experiments to define its performance.

ANTICIPATED RESULTS;

A modified Plumetracker instrument will be built and tested in the laboratory.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	26.5			26.5
	Salaries :	15.5			15.5
Budget	Total :	42.0			42.0
Source:RAC	Man Years :	0.5			0.5
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1985

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : May 26, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Development of Polysulfide Technology for Treatment of Concentrated Spent Cyanide Liquors

PROJECT NO: 233G
START DATE: (m/yr): 03/86
RES. PRIORITY:

SHORT TITLE: Cyanide Liquors

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. J.J. Ganczarczyk, Department of Civil Engineering University of Toronto
LIAISON OFFICER: (name, location, phone no.)	A. Oda - Waste Management Branch 323-5129

INTERNAL PROJECTS

Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To develop a simple, safe and inexpensive method for detoxification of concentrated spent cyanide liquors generated in electroplating shops.

PROJECT DESCRIPTION: Polysulfide reacts with cyanide forming thiocyanate which may also be partially decomposed by an excess of polysulfide; sulfide and hydroxide ions present in the reagent precipitate heavy metals in the spent liquors; feasibility of this treatment method has been confirmed in previous studies, but several technological questions remain unanswered.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	11.0			11.0
	Salaries :	22.0			22.0
Budget	Total :	33.0			33.0
Source:RAC	Man Years :	0.6			0.6
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):1) Report, "Development of Polysulfide Technology for Treatment of Concentrated Spent Cyanide Liquors"; 2) Paper presented at Tech. Trans. Conf., 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: Project is completed except for the final report.

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract X	Solicited	Date : May 28, 1987
INTERNAL	Grant	Unsolicited X	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Municipal Solid Waste-Feasibility of Gasification with Plasma ARC

PROJECT NO: 234C
START DATE: (m/yr): 03/86
RES. PRIORITY:

SHORT TITLE: Gasification with Plasma ARC

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: A. Tsangaris and G. Carter, Resorption Canada Ltd.

LIAISON OFFICER: (name, location, phone no.) Pat DeAngelis - Waste Management Branch 323-5130

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To demonstrate the operational and environmental benefits of plasma arc gasification of municipal solid waste (MSW) and its potential acceptability in Waste Management.

PROJECT DESCRIPTION: Resorption Canada Limited (RCL), OBOE Engineering Ltd and Ontario Hydro propose a feasibility study to conduct experimentation with MSW within the RCL plasma arc research facility to demonstrate the salient operational and environmental characteristics of such a process. The existing RCL plasma research facility is presently capable of gasification of MSW, however, it would require the optimization of some of its equipment plus the addition of some other equipment in order to permit the total operation results which would be required. The work schedule has been organized into two stages, stage 1 to determine the Higher Heating Value (HHV) of the product gas and the total process heat balance, and Stage 2 to determine the environmental acceptability of the process and the subsequent combustion of the product gas. Organization in this manner permits a decision point at the end of stage 1 to permit the assessment of the heat balance results obtained prior to the commencemnt of Stage 2. The expected duration of the project is 59 weeks.

BUDGET AND RESOURCES:	Year: (* current)	1	2 *	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	25.0	50.0		75.0
Budget	Salaries :				
Source:RAC	Total :	25.0	50.0		75.0
	Man Years :	1.2	0.5		1.7
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at the Tech. Trans. Conf., 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):
Cost sharing with the Ministry of Energy

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract X	Solicited	Date : May 27, 1987
INTERNAL	Grant	Unsolicited X	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Ottawa River Nuclear Spill Contingency Model Development - Phase II

PROJECT NO: 235C
START DATE: (m/yr): 04/86
RES. PRIORITY:

SHORT TITLE: Ottawa River Nuclear Spill - Phase II

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Drs. T.P. Halappa Gowda, M. Palmer and R. Janois Gore & Storrie Limited
LIAISON OFFICER: (name, location, phone no.)	W. Scheider - Water Resources Branch 323-4925

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To interface 1-D model algorithms with TWODIFIN model; to develop algorithms for special distributions at specified times; to carry out model validation studies; to optimize process parameters; to incorporate a user-specified graphical package; to develop algorithms for interactive model of execution, and to familarize MOE staff on model operation aspects.

PROJECT DESCRIPTION: As part of the Ministry's nuclear spill contingency planning for the Ottawa River, Gore & Storrie developed the model TWODIFIN. It is proposed to make the model more versatile for use by incorporation features such as a graphical package and algorithms for 1-D predictions and spatial distributions. The model will be validated using the 1984 tracer study and 1981 tritum spill data.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	27.2			27.2
	Salaries :	12.8			12.8
Budget	Total :	40.0			40.0
Source:RAC	Man Years :	0.4			0.4
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract	Solicited	Date : May 22, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 5, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: The Use of Various Bacterial Short-Term Tests to Screen Industrial Effluents for Mutagenic Activity

PROJECT NO: 237G
START DATE: (m/yr): 03/86
RES. PRIORITY:

SHORT TITLE: Bacterial Short-Term Test

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. D. Logan York University
LIAISON OFFICER: (name, location, phone no.)	D. Rokosh - Water Resources Branch 235-5787

INTERNAL PROJECTS

Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To evaluate the suitability of the Fluctuation Assay for mutagenicity testing for various industrial sectors, to screen industrial aqueous effluents for mutagenic activity and to set the priority for such effluents, based on their mutagenic activity, for additional genotoxicity testing.

PROJECT DESCRIPTION: Industrial effluent samples, to a maximum number of 30 from a variety of industrial sectors, including pulp and paper, mining and petrochemical, will be provided for testing by the Ministry of the Environment. These effluents will be screened for mutagenic activity, utilizing the Ames Plate Incorporation Assay and the Fluctuation Assay (reportedly more sensitive to mutagenic compounds than the plate incorporation assay). Effluents will be pH adjusted (if necessary) and sterilized (using pressure filtration) but their chemical concentration will not be altered. On completion of the testing a report will be prepared containing a summary of screening data and a ranking of samples based on their mutagenic activity. An attempt will be made to relate this activity with historical chemical analysis of effluents from specific industries.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	2.0			2.0
Budget	Salaries :	10.0			10.0
Source:RAC	Total :	12.0			12.0
	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
Budget	Salaries :				
Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract X	Solicited	Date : May 27, 1987
INTERNAL	Grant	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Water Use. Kraft Mills

PROJECT NO: 238C
START DATE: (m/yr):
RES. PRIORITY:

SHORT TITLE: Water Use Study

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Nicholas C.A. Felix, Project Manager Giffels Associates Limited
LIAISON OFFICER: (name, location, phone no.)	W. Subboch - Water Resources Branch 323-4884

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To investigate and report on how water is used in Ontario's Kraft Mills, the potential for further reduction of water usage and its impact on the quality of the effluent.

PROJECT DESCRIPTION: Each of nine Kraft mills will be visited to meet with the management; to examine the operations; and to collect the pertinent data for this study. The data will include information on the quality of water used per ton of product; procedures currently in place to conserve water; and the potential for alterations to the process to further reduce water usage.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	21.8			21.8
	Salaries :	12.4			12.4
Budget	Total :	34.2			34.2
Source:RAC	Man Years :	0.3			0.3
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract	Solicited	Date : May 22, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Assessment of Contaminant Migration from Industrial and Landfill Sources in the Twelve Mile Creek and Welland River Watersheds

PROJECT NO: 240G
START DATE: (m/yr): 04/86
RES. PRIORITY:

SHORT TITLE: Twelve Mile Creek

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Dr. M. Dickman and Dr. I. Brindle, Biological Science and Chemistry Depts - Brock University

LIAISON OFFICER: (name, location, phone no.) Mr. S. Irwin - MOE Hamilton (416) 521-7704

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. To determine the industrial and agricultural sources and classes of organic contaminants and toxic metals in the Twelve Mile Creek and Welland River. 2. To estimate contaminant loadings of in-place pollutants in sediments. 3. To attempt to correlate the findings with the toxicity study currently being carried out with funds from the World Wildlife Fund and Department of Employment and Immigration 4. To establish a realistic model for the distribution and fate of the identified contaminants in sediments along the above water courses.

PROJECT DESCRIPTION: Detailed chemical analyses will be carried out on samples obtained from the Welland River and Twelve Mile Creek in an effort to identify the impact of in-place pollutants in sediments on the aquatic ecosystem, by investigating the availability of trace organics and heavy metals, in sediments, to aquatic biota. Water and sediment samples from a minimum of 50 locations at upstream and downstream sites in the two study areas will be analyzed and QA/QC will be maintained in cooperation with MOE labs.

ANTICIPATED RESULTS: Possible sources of industrial pollution and the fate of contaminants in the above water courses will be identified.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	122.9			122.9
Budget	Salaries :	57.1			57.1
Source:RAC	Total :	180.0			180.0
	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
Budget	Salaries :				
Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.) RAC, OPAC, WRB, NER etc.)

EXTERNAL X Contract Solicited Date : May 22, 1987
INTERNAL Grant X Unsolicited X Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: The Use of Aquatic Vegetation and Invertebrates to Monitor Chlorinated Hydrocarbons in the Lake Huron - Lake Erie Corridor

PROJECT NO: 241G
START DATE: (m/yr): 05/86
RES. PRIORITY:

SHORT TITLE: Lake Contamination

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. P.D.N. Hebert, Great Lakes Institute University of Windsor
LIAISON OFFICER: (name, location, phone no.)	W. Scheider - Water Resources Branch 323-4925

INTERNAL PROJECTS
Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): The research has three objectives: 1) to examine the factors affecting the uptake of selected organic contaminants by clams. 2) to examine the usefulness of aquatic vegetation in monitoring selected organic contaminants. 3) to carry out laboratory experiments to calibrate uptake rates (i.e. the relationship between body burden and water concentrations) to provide a basis for interpreting the field data, 4) to assess the concentration of toxic chemicals in major components of the Lake St. Clair biota and 5) to use the data to refine fate and transport models in the Lake St. Clair and St. Clair river.

PROJECT DESCRIPTION: Laboratory and field studies will be carried out to examine the factors affecting contaminant uptake by aquatic vegetation and mussels. Contaminant concentration in selected biotic compartments of Lake St. Clair will be determined. Existing models used for predicting the fate of toxic chemicals will be modified and applied to the St. Clair River and to Lake St. Clair.

BUDGET AND RESOURCES:	Year: (* current)	1	2 *	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	50.0	40.0	20.0	110.0
	Salaries :	50.0	60.0	30.0	140.0
Budget	Total :	100.0	100.0	50.0	250.0
Source:RAC	Man Years :	2.0	2.6	1.8	6.4
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract	Solicited	Date : May 22, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Toxicity of Pentachlorophenol to Zooplankton: Fate and Effects

PROJECT NO: 242G
START DATE: (m/yr): 05/86
RES. PRIORITY:

SHORT TITLE: Pentachlorophenol

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. N.K. Kaushik, Department of Environmental Biology University of Guelph
LIAISON OFFICER: (name, location, phone no.)	Mr. Luek Wong, Water Resources Branch 235-5813

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): The current proposal will examine: (a) Bioconcentration and bioaccumulation of PCPs in Zooplankton using 14C-labelled PCP; (b) Interaction of pH with PCP toxicity and bioavailability; (c) Effect of temperature on PCP toxicity (d) Toxicity tests then may be carried out under field conditions using limnocorrals.

PROJECT DESCRIPTION: Factors affecting the toxicity of PCP such as the age and/or size of the testorgansims, pH, temperature, hardness, and exposure duration on the acute and chronic toxicity of both formulations of PCP to the two species of daphnids will be investigated.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	5.6			5.6
	Salaries :	9.5			9.5
Budget	Total :	15.1			15.1
Source:RAC	Man Years :				
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract X	Solicited	Date : May 22, 1987
INTERNAL	Grant	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Demonstration of the Phoredox Process at Lakeview WPCP

PROJECT NO: 243G
START DATE: (m/yr): 05/86
RES. PRIORITY:

SHORT TITLE: Phoredox Process

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator and Affiliation: George G. Powell, P. Eng.
Gore & Storrie Limited

LIAISON OFFICER: (name, location, phone no.) Mr. K. Brown - South Peel Water Supply System
274-6710

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To evaluate the effect of the introduction of the Phoredox process on overall plant performance.

PROJECT DESCRIPTION: The anaerobic zone in the Phoredox process has the potential to reduce aeration requirements, improve BOD removal, solids settling and sludge handling. Biological removal of phosphorus is also possible. One unit of the Lakeview WPCP will be converted to operate in this mode.

ANTICIPATED RESULTS: 1. Substitution of mixing for aeration results in less power usage.
2. Removal of chemical for phosphorus removal results in reduced operational costs.
3. Improved BOD removal results in potential for retrofitting for fine bubble aeration. This should also reduce operation costs.
4. Improved and lesser solids handling should be experienced.
5. Improved settling results in a better effluent quality.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	5.0			5.0
	Salaries :	20.0			20.0
Budget	Total :	25.0			25.0
Source:RAC	Man Years :	0.2			0.2
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X Contract Solicited
INTERNAL Grant X Unsolicited X

Date : May 29, 1987
Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Treatment of Landfill Leachate by Spray Irrigation

PROJECT NO: 244G
START DATE: (m/yr): 05/86
RES. PRIORITY:

SHORT TITLE: Spray Irrigation

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. R.A. McBride, Land Resource Science University of Guelph
LIAISON OFFICER: (name, location, phone no.)	A. Oda - Waste Management Branch 323-5129

INTERNAL PROJECTS

Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To evaluate leachate spray irrigation as an economic, environmentally-sound, and long-term solution to one particular sanitary landfill seepage problem (Muskoka Lakes) with a view to providing in the long-term recommendations and implementation procedures for this type of waste-disposal across the province.

PROJECT DESCRIPTION: This is a multi-disciplinary study with several research thrusts. The project encompasses a literature review on sanitary leachate disposal phenomena, and individual studies on forest hydrology/sub-hydrology, spray-area soil-vegetation relationships, phytotoxicity, forest evapotranspiration and leachate pretreatment.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	41.0			41.0
	Salaries :	41.5			41.5
Budget Source:RAC	Total :	82.5			82.5
	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports): Report: " Treatment of Landifll Leachate by Spray Irrigation"; Paper presented at Tech. Trans. Conf., 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: Project is now completed except for the final report.

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited X	Date : May 22, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Reproductive Outcomes in Southwestern Ontario	PROJECT NO: 245G START DATE: (m/yr): 07/86 RES. PRIORITY:
SHORT TITLE: Reproductive outcomes	MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. J. Robertson, Dept. of Epidemiology and Biostatistics University of Western Ontario
LIAISON OFFICER: (name, location, phone no.)	L.F. Smith - Ministry of Health 963-2238 A. Vajdic - Water Resources Branch 323-4873

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To carry out an epidemiological study of potential health effects caused by chemical spills and potential contamination of drinking water in the Lambton and Kent counties.

PROJECT DESCRIPTION: The level of effects on reproductive outcomes and risk caused by the threat posed by the St. Clair River chemical contamination will be documented retrospectively.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	65.0			65.0
	Salaries :				
Budget	Total :	65.0			65.0
Source:RAC	Man Years :	6.3			6.3
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):
Funded jointly with the Ministry of Health ($65,000).

COMMENTS: Completion date is now January 1988.

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X Contract Solicited Date : May 27, 1987
INTERNAL Grant X Unsolicited X Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Study of the Thermal Reactions of Polychlorinated Dibenzo-p-Dioxins on Flyash Particles under Incinerator Conditions

PROJECT NO: 246G
START DATE: (m/yr): 04/86
RES. PRIORITY:

SHORT TITLE: Dioxins/Flyash

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. F.W. Karasek, Professor of Chemistry University of Waterloo
LIAISON OFFICER: (name, location, phone no.)	Dr. R. Clement - Laboratory Service Branch 235-5890

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): Incinerator flyash will be placed in a heated flowtube. Nitrogen will be passed through the flyash to an impinger/florisil combination which will absorb any organic compounds volatilized from the flyash. Some suspected precursors of chlorinated dioxins and dibenzofurans will be introduced into the gas stream above the flyash. The flyash, flowtube, impinger and florisil will be analysed for dioxins and furans after each experiment. The temperature range of 100 C to 600 C will be investigated.

PROJECT DESCRIPTION: 1. Establish the thermal behaviour of chlorinated dioxins and dibenzofurans on flyash particles under incinerator conditions.
2. Identify precursors and establish mechanisms of dioxin formation on flyash particles.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	24.0			24.0
	Salaries :	6.0			6.0
Budget	Total :	30.0			30.0
Source:RAC	Man Years :	0.5			0.5
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : May 22, 1986
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Metal Uptake by Cladophora Glomerata in Niagara River

PROJECT NO: 248G
START DATE: (m/yr): 04/86
RES. PRIORITY:

SHORT TITLE: Metal Uptake/Cladophora

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. Pamela Stokes, Institute for Environmental Studies University of Toronto
LIAISON OFFICER: (name, location, phone no.)	M. Jackson - Water Resources Branch 235-5812

INTERNAL PROJECTS

Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. To determine the rate of uptake and loss of selected heavy metals in Cladophora Glomerata in the Niagara River.
2. To determine the seasonal variation in selected heavy metals in Cladophora Glomerata in the Niagara River.

PROJECT DESCRIPTION: Rates of uptake and loss of heavy metals in Cladophora will be determined by transfer experiments among sites along the river. Water and algal samples will be taken on a weekly basis throughout the summer; in order to determine seasonal variation in metal levels.

The rate of uptake will be rapid (hours) and the loss rate will be slow. This would lend support to the MOE programme for the use of Cladophora as a biomonitor.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	5.7			5.7
	Salaries :	1.3			1.3
Budget	Total :	7.0			7.0
Source:RAC	Man Years :				
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WBR, NER etc.)

EXTERNAL X Contract Solicited
INTERNAL Grant X Unsolicited X

Date : May 22, 1987
Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Bioassessment of Contaminated Sediments

PROJECT NO: 249G
START DATE: (m/yr): 04/86
RES. PRIORITY:

SHORT TITLE: Sediments/Contaminants

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Drs. C. Nalewajko and C. Ewing, Life Sciences Division University of Toronto

LIAISON OFFICER: (name, location, phone no.) D. Persaud - Water Resources Branch 323-4926

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To develop simple, but sensitive bioassays for the assessment and prediction of the impact of sediment on open water primary contaminant producers and and bacteria.

PROJECT DESCRIPTION: The bioassays will involve measurements of the effects of sediments on (a) phosphate availability to aquatic microorgansims; (b) growth rates as assessed by DNA synthesis; (c) algal growth rates as assessed by chlorophyll biosynthesis. Natural populations will be employed in (a); cultures in (b) and (c). Sediments of interest to MOE will be used for bioassays.

ANTICIPATED RESULTS: Aerobic sediments on disposal in open water can act as a phosphorus sink thereby decreasing phosphorus availability and primary production. Elevated concentrations of contaminants, including heavy metals, can depress primary producers directly, as well as indirectly by decreasing bacterial nutrient cycling.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	4.2			4.2
	Salaries :	6.8			6.8
Budget Source:RAC	Total :	11.0			11.0
	Man Years :	0.4			0.4
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X Contract Solicited Date : May 25, 1987
INTERNAL Grant X Unsolicited X Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Development of an Expert System for Decision Making with Regard to Water Quality in Ontario Rivers

PROJECT NO: 250G & 332G
START DATE: (m/yr): 05/86
RES. PRIORITY:

SHORT TITLE: Water Quality

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. T.E. Unny, Department of Systems Design University of Waterloo
LIAISON OFFICER: (name, location, phone no.)	Dr. L. Logan - Water Resources Branch 323-4984

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To develop an expert system for applications in decision making with regard to water quality in Ontario Rivers with the objective to;

1. provide a basis for the assessment of uncertainties in water quality parameters, and
2. to develop a procedure to determine the effect of random variations in these parameters in decision making.
3. to fill in the knowledge base of parameter specific toxicity. To test the protoype system and modify the program.

PROJECT DESCRIPTION: MOE manages Water Quality Monitoring at strategic locations in Ontario rivers with the objective to assess the effect on water quality, the impact of waste water discharges from municipal and industrial plants and of diffuse sources of wastes from agricultural and other land uses.

Readings on water quality are taken at frequent intervals (generally at the rate of one reading a month) on 65 tributaries. The readings include hydrological parameters (streamflow), physical parameters (temperature, turbidity, etc.) and nutrient parameters.

BUDGET AND RESOURCES:	Year: (* current)	1	2	3 *	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	7.5	7.5	7.5	22.5
	Salaries :	20.0	20.0	20.0	60.0
Budget	Total :	27.5	27.5	27.5	82.5
Source:RAC	Man Years :	1.0	1.0		2.0
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports): Interim report, 1986; Paper presented at Tech. Trans. Conf., 1986; Paper presented at AGU conference, 1987

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: Approved for third year extension to 250RR.

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : May 22, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Pathogenesis of Neoplastic Diseases Afflicting Feral Fish

PROJECT NO: 251G
START DATE: (m/yr): 04/86
RES. PRIORITY:

SHORT TITLE: Neoplastia in Fish

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Dr. M.A. Hayes and I. Smith, Dept. of Pathology, University of Guelph

LIAISON OFFICER: (name, location, phone no.) Dr. D.A. Rokosh - Water Resources Branch 235-5787

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To investigate the role of pre-neoplastic lesions, in skin and liver of wild fish developing full-blown neoplasia, and the value of serum chemistry in detecting general health related to liver disorders.
To include pre-neoplastic lesions in laboratory fish under controlled conditions, in an effort to document their promotion to neoplasia by sediment.
To integrate studies into initiation and promotion of pre-neoplastic lesions. Initiating agents may be detectable through genotoxicity assays. Techniques to detect initiated lesions, which are the next stage in the development of neoplasia, and which are susceptable to promotion, will be developed.

PROJECT DESCRIPTION: Neoplastic epidermal tissues from wild fish will be examined ultrastructurally for evidence of viral etiology. Examination of normal tissues may reveal modifying factors altering the development of neoplasia. Fish with pre-neoplastic lesions will be treated with sediment and/or chemicals in the laboratory. Techniques to isolate pre-neoplastic lesions will be developed or adapted from mammalian work, as will serum enzyme analysis, in an effort to detect general health status in affected fish.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	33.4			33.4
Budget	Salaries :	31.3			31.3
Source:RAC	Total :	64.7			64.7
	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract	Solicited	Date : May 25, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Township of Ignace Groundwater Quality Identification

PROJECT NO: 252G
START DATE: (m/yr):
RES. PRIORITY:

SHORT TITLE: Groundwater Quality

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	D.R. Turnbull, P. Eng. International Water Supply
LIAISON OFFICER: (name, location, phone no.)	Mr. M. Toza - EALUP 323-4475

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): Determine the feasibility of the Vyredox In-ground Biological Treatment for removing iron, manganese, and hydrogen sulphide from ground water before reaching the production wells at Ignace in Northern Ontario.

PROJECT DESCRIPTION: A pilot plant study will be undertaken incorporating the Vyredox process which establishes a biological treatment zone in the aquifer to remove iron, manganese, and hydrogen sulphide.

BUDGET AND RESOURCES:	Year: (* current)	1	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	13.6			13.6
	Salaries :	32.0			32.0
Budget	Total :	45.6			45.6
Source:RAC	Man Years :				
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: Grant paid to Town of Ignace

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X Contract Solicited
INTERNAL Grant X Unsolicited X

Date : May 26, 1987
Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Study of the Spatial Distribution of the Impact of Sudbury Smelting Emissions

PROJECT NO: 254G
START DATE: (m/yr): 04/86
RES. PRIORITY:

SHORT TITLE: Sudbury Emissions

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. E.A. McBean, Department of Civil Engineering University of Waterloo
LIAISON OFFICER: (name, location, phone no.)	N. Reid - Air Resources Branch 965-1634

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S):1. To study the spatial distribution of the impact of emissions from the Sudbury mining smelters;
2. To study the impact of the variability of meteorologic conditions on seasonal and annua
1
deposition patterns with a view to obtaining estimates of necessary length of monitoring records to attain stable statistics;
3. To study the impacts of spatial intensity of monitoring networks to define deposition patterns; and
4. To encompass the assessment information by contouring statistics and thereby provide areal deposition patterns, as opposed to point-specific receptor information.

PROJECT DESCRIPTION: To study, using a combination of statistical analyses and computer assessmen[illegible]he spatial intensity of the APIOS monitoring network, in regard to Sudbury emissions.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	2.2			2.2
Budget Source:RAC	Salaries :	8.7			8.7
	Total :	10.9			10.9
	Man Years :	0.4			0.4
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
Budget Source:	Salaries :				
	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X Contract X Solicited Date : May 28, 1987
INTERNAL Grant Unsolicited X Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Investigate the "Short Term" Mutagenicity and Chemical Composition of Organic Solvent Extractable Fraction of Coke Oven Emissions-Phase II

PROJECT NO: 255C
START DATE: (m/yr): 04/86
RES. PRIORITY:

SHORT TITLE: Coke Oven Emissions (Phase II)

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Dr. G.H. Thomas, Environmental Chemical Engineering Division
Ontario Research Foundation

LIAISON OFFICER: (name, location, phone no.) Dr. G. Diamond - Air Resources Branch
965-4081

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): - to utilize collected coke oven emission samples from 3 steel mills in Ontario to better define the chemical nature of COE (fractionation - Compound Identification - Compound Quantification)
- To relate the findings to the mutagenicity of the various fractions in biological assay studies for comparison with the mutagenicity of nonfractionated material.

PROJECT DESCRIPTION: Phase I of the project has been successfuly completed.

In Phase II, short-term biological tests will be coupled with chemical analysis of complex PAH mixtures for use in environmental health assessment. Various PAH compounds will be identified in emission samples collected both up-wind and down-wind in the vicinity of steel mills.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	64.8			64.8
	Salaries :	44.6			44.6
Budget	Total :	109.4			109.4
Source:RAC	Man Years :				
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1985

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X Contract X Solicited X Date : May 27, 1987
INTERNAL Grant Unsolicited Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Sediment Transport Study

PROJECT NO: 256C
START DATE: (m/yr): 06/86
RES. PRIORITY:

SHORT TITLE: Sediment Transport

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator and Affiliation: Beak Consultants Ltd.

LIAISON OFFICER: (name, location, phone no.) B. Kohli - Water Resources Branch 323-4961

INTERNAL PROJECTS
Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To predict longshore and across-shore suspended and bedload transport rates for varying sediment particle sizes under a range of known environmental conditions (spatial and temporal varying currents, waves and bathymetry). This will permit assessment of the short-term and long-term fates of contaminated sediment particles from sources such as rivers, STP and lakefilling.

PROJECT DESCRIPTION: To conduct a thorough literature search, select a suitable model that can achieve the objectives of study. To design and conduct a 2-month preliminary field program and collect data for model input.

An interactive computer model for IBM PC to be installed on Great Lakes computer facilities. The use of this model will enhance our capabilities in assessing fates of contaminated sediments and complement the ongoing investigations into the suspended sediment inputs and in-place pollutants.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	27.8			27.8
	Salaries :	69.9			69.9
Budget	Total :	97.7			97.7
Source:RAC	Man Years :				
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract X	Solicited	Date : May 28, 1987
INTERNAL	Grant	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Retractable Composite Absorbents for Environmental Clean-up

PROJECT NO: 257C
START DATE: (m/yr): 04/86
RES. PRIORITY:

SHORT TITLE: Retractable Adsorbent

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. A.E. Redpath, President Ecoplastics Ltd.
LIAISON OFFICER: (name, location, phone no.)	Dr. O. Meresz - Laboratory Service Branch 235-5762

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): The clean up of chemically contaminated creek, river bed and lake bottom sediments is a problem of increasing importance. This 3-month study proposes to investigate the combination of two novel technologies: magnetically retractable adsorbents with polymer matrix support systems. It is intended to be a feasibility study that: a) fully defines the practical requirements of polymer based retractible adsorbent system, b) demonstrates in the laboratory the technical feasibility of the process and c) using examples from b), provides the basis for a patent application.

PROJECT DESCRIPTION: The project will have three basic tasks, consistent with the objectives given above. Firstly, a literature review and technological survey will be made to define suitable materials and methods from which magnetically retractible polymeric adsorbents can be manufactured. In consultation with MOE personnel the best means of field application of the technology will be defined. Secondly, test retractable adsorbents will be prepared (based on the information from the first task) and tested in the laboratory. The final task will be a patent search and new patent preparation using the results of the first two task.

A patent has been applied for by MOE.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	20.2			20.2
	Salaries :	9.4			9.4
Budget	Total :	29.6			29.6
Source:RAC	Man Years :	0.3			0.3
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract X	Solicited	Date : May 28, 1987
INTERNAL	Grant	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Sound Levels at a Distance From Industrial Plants

PROJECT NO: 258C
START DATE: (m/yr): 02/87
RES. PRIORITY:

SHORT TITLE: Sound Level

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Mr. Tim Kelsall and D.A. Ogilvie Hatch Associates
LIAISON OFFICER: (name, location, phone no.)	L. Kende - EALUP 323-4458

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. To validate the prediction methodology used in C.S.A. standard Z107.55; 2. Encourage the prediction's use and help standarize the format of noise impact assessments by computerising it, allowing wide distribution.

PROJECT DESCRIPTION: The prediciton would be validated in two ways;
1. The results of similar predictions would be compared with sound levels of completed installations.
2. Certain aspects of the prediction would be field tested.

A user-friendly computer implementation of the prediction on popular computers would be prepared.

The computer implementation is expected to be widely distributed by M.O.E., H.A.L. or C.S.A. This should result in its increased use in preparing noise impact assessments. Standardising the methods used in these assessments will improve their quality and speed their review.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	3.0			3.0
	Salaries :	25.5			25.5
Budget Source:RAC	Total :	28.5			28.5
	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : May 25, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Application of the Fugacity Model to Predicting the Behaviour of Arsenic in the Environment

PROJECT NO: 259G
START DATE: (m/yr): 05/86
RES. PRIORITY:

SHORT TITLE: Fugacity-Arsenic

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Dr. D. Mackay and M.L. Diamond, Institute for Environmental Studies, Univeristy of Toronto

LIAISON OFFICER: (name, location, phone no.) Deo Persaud - Water Resources Branch 323-4926

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): Is to develop a model (suitable for use by Ministry staff) which can be used to predict the dynamics and fate of inorganic substances in aquatic systems. The model will be initially appllied to predict the behaviour of arsenic in the Moira River system in Eastern Ontario and to track its recovery from decreasing primary inputs of arsenic. The model will incorporate inputs of arsenic from contaminated sedimetns, and as such, will quantify the flux of aresenic at the sediment/water interface. Results from this model will be applicable to additional metals in other geographic areas.

PROJECT DESCRIPTION: A preliminary model will be developed based on the information obtained from the literature. The results obtained from this model will be used to orient the direction of further research. It is anticipated that at least some laboratory and field measurements will be necessary to quantify the arsenic species present in the system and the flux of arsenic at sedimentwater interface. These measurements will then be used to improve the reliability and accuracy of the model.
The results obtained from this study can be used on two levels. First, the results will provide insight into the dynamics and fate of arsenic in the Moira River. The model can be used to document the success of remedial abatement measures undertaken at Deloro and to provide an estimate on the time required for recovery of the system. As well, the model may be used to test any additional abatement measures that may be proposed. Secondly, the model will serve as the basis for extension to arsenic in other aquatic systems, and additional elements in other geographic locations.

BUDGET AND RESOURCES:	Year: (* current)	1	2 *	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	8.5	3.7		12.2
	Salaries :	14.0	14.7		28.7
Budget	Total :	22.5	18.4		40.9
Source:RAC	Man Years :	1.4	1.4		2.8
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X Contract Solicited Date : May 25, 1987
INTERNAL Grant X Unsolicited X Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Accumulation and Pathways of Mercury in Benthic Invertebrates

PROJECT NO: 260G
START DATE: (m/yr): 04/86
RES. PRIORITY:

SHORT TITLE: Accumulation of Mercury

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. Pamela Stokes, Institute forz Environmental Studies University of Toronto
LIAISON OFFICER: (name, location, phone no.)	G. Mierle - Water Resources Branch Dorset Research Centre (705) 766-2412

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): The overall objective of the study is aimed at a better understanding of the fate of mercury in invertebrates, in order to fill the missing link between fish mercury and sediment mercury contents. A better understanding of mercury in remote aquatic ecosystems should be achieved.

PROJECT DESCRIPTION: The study is divided in two parts. Field work will be done in the first year on three lakes (Lake Vernon, Mary and Fairy Lakes) where the fish mercury is high, and on one control lake. Quantitative data will be obtained on the benthic community. Mercury analysis will be done on bulk samples, and on abundant organisms. In the second year, the pathways of mercury will be studied in a microcosm in the lab. Mercury will be monitored in the sediments, water, organisms at different time during the experiment.

The project will permit to evaluate the potential contribution of benthic invertebrates to fish mercury. Specie(s) or group of species that are good bioaccumulator of mercury shall be identified. Mercury concentrations in invertebrates should vary between sites on the same lake. Finally the importance of benthic invertebrates in mercury cycling in the environment will be determined.

BUDGET AND RESOURCES:	Year: (* current)	1	2 *	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	13.0	7.5		20.5
	Salaries :	17.2	7.3		24.5
Budget Source:RAC	Total :	30.2	14.8		45.0
	Man Years :	1.5	0.6		2.1
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : May 26, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Dispersion of the Stouffville Contaminant Plume

PROJECT NO: 261G
START DATE: (m/yr): 04/86
RES. PRIORITY:

SHORT TITLE: Stouffville

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. R. N. Farvolden and E.O. Frind University of Waterloo, Institute for Groundwater Research
LIAISON OFFICER: (name, location, phone no.)	A. Mellary - Central Region 424-3000

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. To determine the hydrogeologic factors at the Stouffville site that are important in the development and dispersion of contaminant plumes that have been identified in previous work;
2. To describe the contaminant plumes, and their history;
3. To predict future development or dispersion of the plume(s). We plan to utilize, in a modest way, all modern techniques at our disposal to address this problem.

PROJECT DESCRIPTION: The study has used other parameters in addition to Chloride to determine their migrational behaviour. Transport modelling technique were applied to simulate the migration and dispersion of the contaminant plume. Further work is planned to include the installation of four new multilevel piezometers to increase the validity of the mathematical models. Comparison of reactive compounds migration with the conservative case will provide information on attenuation characteristics of the aquifer.
ANTICIPATED RESULTS:

The results will provide a better understanding of the mechanisms which influence plume development in this major aquifer and an indication of what can be expected in the future.

Also, we should learn what parameters and hydrogeological factors are most useful in understanding plume migration.

BUDGET AND RESOURCES:	Year: (* current)	1	2 *	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	18.4	14.0		32.4
	Salaries :	7.0	3.5		10.5
Budget	Total :	25.4	17.5		42.9
Source:RAC	Man Years :	0.8	0.5		1.3
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : May 22, 1987
INTERNAL	Grant X	Unsolicited X	Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Treatment of Municipal Sewage Lagoon Effluent by Means of Rapid Infiltration at Markdale

PROJECT NO: 262G
START DATE: (m/yr): 04/86
RES. PRIORITY:

SHORT TITLE: Lagoon Effluent Treatment

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Mr. E. Foy, Village of Markdale
LIAISON OFFICER: (name, location, phone no.)	B. Novakovic - MOE Southwestern Region (519) 661-2200

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): Variable hydraulic loading of infiltration basins will be used to develop an appropriate loading cycle.
This will result in: a) Optional utilization of each basin, b) provide maximum treatment of infiltrated municipal sewage lagoon effluent, and c) protection of surface water.

PROJECT DESCRIPTION: Variable hydraulic loading of infiltration basins will be used to develop an appropritae loading cycle.

This will result in: a) Optional utilization of each basin, b) provide maximum treatment of infiltrated municipal sewage lagoon effluent, and c) protection of surface water.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	10.5			10.5
	Salaries :	14.5			14.5
Budget Source:RAC	Total :	25.0			25.0
	Man Years :	1.1			1.1
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X Contract X Solicited Date : May 27, 1987
INTERNAL Grant Unsolicited X Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: A Method for Prevention and Mitigation of Nuisance Blue-Green Algal Blooms in Eutrophic Waters in Ontario

PROJECT NO: 264C
START DATE: (m/yr): 05/87
RES. PRIORITY:

SHORT TITLE: Blue-green Algae

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Lewis Molot, Aquatic Scientist Booth Aquatic Research Group
LIAISON OFFICER: (name, location, phone no.)	K. Nicholls - Water Resources Branch 235-5810

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To enhance the recreational value of eutrophic lakes and impoundments by preventing dominance of phytoplankton communities by nuisance blue-green algae (cyanophyta)

PROJECT DESCRIPTION: The proposed technique for control of blue-green algae is to increase total CO_2 concentrations by the addition of $Ca(OH)_2$. An enclosure experiment is recommended which will allow development of dosing criteria at minimal cost.

ANTICIPATED RESULTS;
An increase in total CO_2 concentration prior to the beginning of the growing season should prevent the growth of major blue-green algal blooms. The absence of surface scums will enhance the recreational value of the aquatic systems.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	9.0			9.0
	Salaries :	9.9			9.9
Budget	Total :	18.9			18.9
Source:RAC	Man Years :	0.2			0.2
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract X	Solicited	Date : June 4, 1987
INTERNAL	Grant	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Biotechnology and The Resource Sector: The Need for Policy Development

PROJECT NO: 265C
START DATE: (m/yr): 07/86
RES. PRIORITY:

SHORT TITLE: Biotechnology

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Doug MacDonald, Executive Director Canadian Environmental Law Research Foundation
LIAISON OFFICER: (name, location, phone no.)	Dr. J. Donnan - Policy and Planning Branch 323-4578

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. Identify activities and organizations in Canada which are involved in the development and/or application of organisms genetically altered by recombinant DNA techniques.
2. Identify, quantify and priorize potential environmental/health effects associated with the release of these organisms.
3. Determine policy issues and approaches for regulating the development and use of these organisms.

PROJECT DESCRIPTION: By means of literature reviews and interviews, relevant recombinant DNA work in Canada will be identified, environmental effects will be postulated and policy issues and approaches will be determined. Seminars will be held to obtain a tentative consensus and possibly, a priority listing about environmental effects and policy issues.

Study findings will provide MOE with a foundation for development of biotechnology policy.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	20.6			20.6
	Salaries :	27.4			27.4
Budget	Total :	48.0			48.0
Source:RAC	Man Years :	0.7			0.7
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract X	Solicited	Date : May 27, 1987
INTERNAL	Grant	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Improvements to the "OPTSTOR" Program for Determining Optimum In-System Storage Requirements in Over-loaded Sewer Systems

PROJECT NO: 266C
START DATE: (m/yr): 10/86
RES. PRIORITY:

SHORT TITLE: OPTSTOR

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: S. Zemell and R. Bishop, MacLaren Plansearch Inc.

LIAISON OFFICER: (name, location, phone no.) W. Wong - Water Resources Branch 323-4982

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. To further develop the existing OPTSTOR model to enhance its capabilities. 2. To demonstrate the OPTSTOR methodology with an example case study.

PROJECT DESCRIPTION: The OPTSTOR model is a computer analysis tool. It provides a simple means for analyzing mathematically results of sophisticated hydrologic models to identify the most cost-effective alternative designs of sewage detention locations and volumes to reduce overflow and basement flooding. OPTSTOR must be used in conjuction with a hydrologic model and works on IBM-PC computers.
The proposed further development of OPTSTOR includes an increase in the number of storage locations (presently a maximum of 8) that may be analyzed; modification of algorithms to make the model suitable for universal application; and writing of a user manual which is not available.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	6.0			6.0
	Salaries :	15.0			15.0
Budget	Total :	21.0			21.0
Source:RAC	Man Years :	0.2			0.2
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports): 1) A computer simulation model (OPTSTOR) and operation manual. 2) A working session to demonstrate use of model to client's staff.

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X   Contract   Solicited
INTERNAL   Grant X   Unsolicited X

Date : May 22, 1987
Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Lake Water Quality Monitoring Based on Remotely Sensed Data: An Interdisciplinary Study

PROJECT NO: 267G
START DATE: (m/yr): 07/86
RES. PRIORITY:

SHORT TITLE: Remote Sensing of Lakes

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. J. Roger Pitblado, Department of Geography Laurentian University
LIAISON OFFICER: (name, location, phone no.)	W. Keller - OME (N.E. Region) (705) 675-4501

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): This is to be a full-scale test of using remote sensors for water quality monitoring of a sample of the Province's lakes. The immediate aim of the project is to assess the feasibility of using remotely sensed data for the discrimination of acidified/ non-acidified lakes and the general trophic status of thos lakes. The project has been designed as a major component of an interdisciplinary study in association with the Ontario Geological Survey, Ontario Centre for Remote Sensing, and the Environmental Research Institute of Michigan.

PROJECT DESCRIPTION: Spectral reflectance data from three "state-of-the-art" remote sensing instruments will be evaluated as will several image analysis and numberical techniques. Associations between lake surface water parameters and spectral reflectance data will be derived from over 500 lakes in Northeastern Ontario. This will include historical comparisons (1974-76/1981-83) as well as comparisons of contemporary data collected for 300 lakes in the Batchawana Mtn. and Sudbury areas.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	93.5			93.5
	Salaries :	1.5			1.5
Budget Source:RAC	Total :	95.0			95.0
	Man Years :	0.6			0.6
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: Funded by a grant of 95K to Laurentian University, and 15K to the Northeast Region. Total funding is 110K. Ministry of Natural Resources provided logistic support. Data on 300 lakes were provided by the Environmental Research Institute of Michigan.

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract X	Solicited	Date : May 28, 1987
INTERNAL	Grant	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: A Study of High Temperature Photochemical Kinetics of Sulphur Dioxide and Nitrogen Oxides for a Flue Gas Treatment Process

PROJECT NO: 268C
START DATE: (m/yr): 09/86
RES. PRIORITY:

SHORT TITLE: Flue Gas Treatment

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. Robert B. Caton, Vice President and Director Concord Scientific Corporation
LIAISON OFFICER: (name, location, phone no.)	Ken Smith - Air Resources Branch 965-5776

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S):1. To measure the rates and quantum yields (photon efficiencies) for the UV photochemical oxidation of sulphur dioxide and nitrogen oxides in gas mixtures simulating the composition and operating temperature of coal-fired thermal power plant flue gases.
2. To assess the feasibility of the process for larger-scale applications, taking into account lamp characteristics for available equipment and projected costs.
3. To verify the predictive capability of a computerized model of the oxidation process so that it may be used to optimize conditions for design of a pilot plant.

PROJECT DESCRIPTION: An eight-month laboratory study will be conducted to measure the removal rate and efficiencies of SO_2 and NO_x in a variety of synthetic gas mixtures at 200-250 C under short-wavelength (less 200nm) irradiation. The results of a computerized photochemical kinetics model will be compared with the experimental results to confirm the validity of the model.

The results will be used to assess design requirements for adaptation of the process and possibly for design of a pilot plant to test more realistic application of the UV process.

BUDGET AND RESOURCES:	Year: (* current)	1	2 *	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	45.0	11.6		56.6
	Salaries :	33.8	137.1		170.9
Budget Source:RAC	Total :	78.8	148.7		227.5
	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):
Final report due by December 31, 1987.

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : May 22, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Factors Influencing Trace Metal Levels in Zooplankton in Ontario Lakes

PROJECT NO: 269G
START DATE: (m/yr): 10/86
RES. PRIORITY:

SHORT TITLE: Zooplankton Metals

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. G.L. Mackie University of Guelph
LIAISON OFFICER: (name, location, phone no.)	W. Keller - N.E. Region (705) 675-4501

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To determine if the concentrations in zooplankton of a variety of metals may be predicted from proximity to a known source, the pH, Ca or organic carbon levels of the lakewaters, the Ca content of the plankton and/or the composition of the zooplankton communities.

PROJECT DESCRIPTION: Zooplankton samples will be collected. Information on the size, identity and feeding guild of each enumerated animal will be computer-logged. Samples for metal analysis will be processed by Inductively Coupled Plasma Emission Spectroscopy.

Benefits:

Help predict the concentrations of trace metals in zooplankton at a-distance from a known large point source of metal emissions by using the pH, Ca, or organic carbon level of lakewater.

BUDGET AND RESOURCES:	Year: (* current)	1	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	15.3			15.3
Budget	Salaries :	14.7			14.7
Source:RAC	Total :	30.0			30.0
	Man Years :	1.1			1.1
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract	Solicited	Date : May 26, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Development and Evaluation of Methods and Instrumentation for the Direct Analysis of Solids by Inductively Coupled Plasma Atomic Emission Spectrometry

PROJECT NO: 270G
START DATE: (m/yr): 09/86
RES. PRIORITY:

SHORT TITLE: Plasma Atomic Emission

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. Eric Salin, Department of Chemistry McGill University
LIAISON OFFICER: (name, location, phone no.)	D. Boomer - Laboratory Services Branch 235-5858

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): The development of instrumentation and methodologies which will allow the direct analysis of solid and difficult liquid samples.

PROJECT DESCRIPTION: Inductively coupled plasma atomic emission optical detection methods will be used for multielemental analysis. Furnace and direct sample insertion methods will be evaluated.

Benefits:

1) Increased sample throughout;
2) Cost reduction;
3) Reduced matrix effects with an improvement in accuracy and detection limits;
4) Speed processing of complex environmental samples;
5) Rapid analysis of new sample types;
6) Transfer of developed technology to MOE laboratory.

BUDGET AND RESOURCES:	Year: (* current)	1	2 *	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	8.5	8.8	9.1	26.4
	Salaries :	31.7	33.0	34.2	98.9
Budget	Total :	40.2	41.8	43.3	125.3
Source:RAC	Man Years :				
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X Contract Solicited
INTERNAL Grant X Unsolicited

Date : May 22, 1987
Revision: August 28, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: The Effects of pH, Aluminum and Drought on Sugar Maple Seedlings

PROJECT NO: 271G
START DATE: (m/yr): 10/86
RES. PRIORITY:

SHORT TITLE: Sugar Maple Seedlings

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator and Affiliation: Dr. M. Havas and Dr. V. Timmer, Faculty of Forestry University of Toronto

LIAISON OFFICER: (name, location, phone no.) W. McIlveen - Air Resources Branch 965-4081

INTERNAL PROJECTS
Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To determine if aluminum, low pH, and drought act together to reduce growth of sugar maple seedlings. To determine whether nutrient status of leaves and aluminum content of leaves and stems can be used to diagnose aluminum stress.

PROJECT DESCRIPTION: Sugar maple seedlings will be grown in natural soils from acid stressed areas as well as in an inert medium. Varying concentrations of aluminum, water pH and drought treatments will be applied during the growth period. Germination rates, survival and growth parameters will be measured. Foliar nutrient and aluminum levels will be analyzed to discern if application of acidic water affects uptake or availability of these elements.

For Ministry application:
1) May help explain rapid die-back of sugar maples;
2) There may be a potential to alleviate stress of Al and low pH by addition of nutrients;
3) Foliar chemistry may be used as a diagnostic tool of identify aluminum stress.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	5.8			5.8
	Salaries :	21.6			21.6
Budget	Total :	27.4			27.4
Source:RAC	Man Years :	2.7			2.7
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : May 26, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Identification of Long-Range Aerosol Sources at the Dorset Environmental Station

PROJECT NO: 272G
START DATE: (m/yr): 03/87
RES. PRIORITY:

SHORT TITLE: Long Range Aerosols

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Dr. D.R. Smith, McMaster Nuclear Reactor
McMaster University

LIAISON OFFICER: (name, location, phone no.) N. Reid - Air Resources Branch
965-1634

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To employ various methods in medium and high flux Neutron Activation Analysis to help elucidate regional sources of air pollution.

PROJECT DESCRIPTION: Several techniques in neutron activation including thermal, epithermal and prompt-gamma analysis will be developed specifically to identify metal content in aerosols.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	10.0	10.5		20.5
	Salaries :	25.9	28.0		53.9
Budget	Total :	35.9	38.5		74.4
Source:RAC	Man Years :	0.9	0.9		1.8
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X Contract Solicited Date : May 25, 1987
INTERNAL Grant X Unsolicited X Revision: August 28, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Perception and Use of Water Demand Management Strategies in Ontario Municipalities

PROJECT NO: 273G
START DATE: (m/yr): 09/86
RES. PRIORITY:

SHORT TITLE: Water Demand

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator and Affiliation: Dr. Reid Kreutzwiser, Department of Geography University of Guelph

LIAISON OFFICER: (name, location, phone no.) P. Joseph - EALUP 323-4449

INTERNAL PROJECTS
Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To assess the committment of Ontario Municipalities to water conservation, identify factors affecting conservation practice and provide recommendations to encourage municipal water conservation.

PROJECT DESCRIPTION: Use of an attitudinal and fact-finding questionnaire survey of water managers in Ontario municipalities to satisfy the objectives. The survey will provide the data necessary to measure the water conservation commitment to water demand management.

Benefits:

Provides a basis for enhancing water conservation efforts among Ontario municipalities.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	1.1	.6		1.7
	Salaries :	4.1	2.7		6.8
Budget	Total :	5.2	3.3		8.5
Source:RAC	Man Years :	0.3	0.2		0.5
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports): Questionnaire sent to all water system managers in Southern Ontario.

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: Response to over 50% of questionnaires sent now being evaluated.

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract	Solicited	Date : May 25, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Characterization of the Fecal Indicator Bacterial Flora of Sanitary Sewage with Application of Identify the Presence of Sanitary Waste in Storm Sewers

PROJECT NO: 274G
START DATE: (m/yr): 09/86
RES. PRIORITY:

SHORT TITLE: Sewage Bacteria

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. P. Seyfried, Department of Microbiology University of Toronto
LIAISON OFFICER: (name, location, phone no.)	Mike Young - Laboratory Services Branch 235-5866

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. To determine the concentrations of fecal indicator bacteria in storm water and storm sewers at selected Toronto locations;
2. To identify the species present in the above bacterial population
3. To conduct the above analysis on sanitary sewers serving the same areas;
4. To develop a method to determine the presence of sanitary waste in storm sewers;
5. To apply the above procedure to the tracing of illegal sanitary connections to priority storm sewers in the Metro Toronto Area.

PROJECT DESCRIPTION: Samples will be collected from selected sites and analyzed for various types of fecal forms. The wastewater is then characterized.

The obtained information will improve Ministry ability to identify the presence of human fecal waste in intermediate sample types such as storm sewers, and would assist in making corrective measures.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	45.0	33.5		78.5
	Salaries :	51.5	46.8		98.3
Budget	Total :	96.5	80.3		176.8
Source:RAC	Man Years :	3.9	3.3		7.2
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X Contract Solicited
INTERNAL Grant X Unsolicited X

Date : May 25, 1987
Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: An Ecosystem Approach to the Monitoring of Organic Aquatic Contaminants in the Muskoka - Haliburton Region

PROJECT NO: 275G
START DATE: (m/yr): 09/86
RES. PRIORITY:

SHORT TITLE: Organics in Muskoka-Haliburton

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Dr. C.D. Metcalfe, ERS Program/Biology
Trent Univeristy

LIAISON OFFICER: (name, location, phone no.) John Ralston - Water Resources Branch
323-4924

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To investigate the sources and fate of persistent organic contaminants in lakes within the Muskoka/Haliburton/Renfrew area, and to assess whether these compounds are a long-term environmental hazard.

PROJECT DESCRIPTION: The study will consist of a lake ecosystem monitoring program. Samples will be taken from a "gradient" of lakes varying from those in pristine locations (atmospheric deposition of contaminants only) to others which received point-source discharges of contaminants (eg. PCB laden road oil).

The obtained information would indicate the major pathways of the contaminants, as well as their fate in selected lakes.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	36.0	22.0	20.5	78.5
Budget	Salaries :	51.0	58.0	58.0	167.0
Source:RAC	Total :	87.0	80.0	78.5	245.5
	Man Years :	3.2	3.6	3.6	10.4
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract	Solicited	Date : May 25, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Klebsiella Pneumoniae Membrane Filtration Procedure

PROJECT NO: 276G
START DATE: (m/yr): 09/86
RES. PRIORITY:

SHORT TITLE: Klebsiella by Pneumoniac

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. P. Seyfried, Department of Microbiology University of Toronto
LIAISON OFFICER: (name, location, phone no.)	M. Young - Laboratory Services Branch 235-5866

INTERNAL PROJECTS

Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. Development of a protocol for the enumeration of Klebsiella pneumoniae from environmental samples;
2. Determination of the ability of experimental methods to isolate Kp. sensu stricto;
3. Assessment and documentation of the performance characteristics of the method of choice.

PROJECT DESCRIPTION: Samples isolated from a variety of environmental materials will be analyzed by membrane filtration. Ten isolates will be obtained from each medium/sample combination. Methods with best specificity and selectivity will have their counting range and accuracy determined. A final report will be prepared detailing and evaluating all results and indicating the method of choice.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	14.5			14.5
	Salaries :	48.3			48.3
Budget	Total :	62.8			62.8
Source:RAC	Man Years :	2.2			2.2
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract X	Solicited	Date : May 27, 1987
INTERNAL	Grant	Unsolicited X	Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Availability of Zinc to Benthic Organisms from Sediment Fractions

PROJECT NO: 277C
START DATE: (m/yr): 09/86
RES. PRIORITY:

SHORT TITLE: Zinc-Benthic Organisms

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. J. Fitchko and Dr. D. Andrews IEC Beak Consultants Ltd.
LIAISON OFFICER: (name, location, phone no.)	D. Persaud - Water Resources Branch 323-4926

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To identify sediment chemical fractions serving as a source of zinc to benthic feeders; to assess vertical distribution of these fractions; to compare bioavailability of recent and "aged" zinc and re-examine MOE data to generate a predictive relationship between zinc in sediment and benthic feeders.

PROJECT DESCRIPTION: The study will take four major steps:
1) Sources of Zinc to Benthic Deposit Feeders
2) Chemical partitioning of zinc with sediment deposit
3) Zinc Exchange/Sediment Bioavailability
4) Predictive Correlations of MOE Data

Benefits:

This study will provide information directly applicable to the management of zinc released to the aquatic environment.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	25.9			25.9
	Salaries :	16.6			16.6
Budget	Total :	42.5			42.5
Source:RAC	Man Years :	0.2			0.2
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract X	Solicited	Date : May 27, 1987
INTERNAL	Grant	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Trend Analysis Procedures for PWQMN Data Series

PROJECT NO: 278C
START DATE: (m/yr): 07/87
RES. PRIORITY:

SHORT TITLE: PWQMN Trend Analysis

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. A.I. McLeod McLeod-Hipel & Associates Ltd.
LIAISON OFFICER: (name, location, phone no.)	Dr. B. Bodo - Water Resources Branch 323-4823

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To develop operational statistical and graphical trend analysis procedures specifically for the PWQMN data base.

PROJECT DESCRIPTION: Compile representative data base. Conduct exploratory analysis to characterize fundamental data properties. Develop numerical and visual reporting formats. Develop trend analysis procedures and operational software.

Benefits:

Significant upgrading of the level of analysis by MOE staff and outside data users. Enhanced capacity to assess degradation of water quality or improvements due to remedial action.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	3.0	3.0		6.0
	Salaries :	17.0	17.0		34.0
Budget	Total :	20.0	20.0		40.0
Source:RAC	Man Years :	0.2	0.2		0.4
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: Project is just getting underway, it should move into high gear within the next two months.

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X Contract X Solicited
INTERNAL Grant Unsolicited X

Date : May 27, 1987
Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Assessment of the Influence of Various Factors on Water Use Across Ontario - Stage I

PROJECT NO: 279C
START DATE: (m/yr):
RES. PRIORITY:

SHORT TITLE: Water Distrib. Systems

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	A.P. Haslam and L.D. Smith, P. Eng. Gore & Storrie Limited
LIAISON OFFICER: (name, location, phone no.)	W. Brink - EALUP 323-4499

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To obtain a better understanding of the wide diversity in water consumption by various communities across the province so that future planning can be more effective.

PROJECT DESCRIPTION: Development of the format for a computer data base for an IBM-PC and the entering of data (on water consumption and the known factors affecting consumption) where this is readily available.

Benefits:

If influences on water demands in different settings are better understood, the relative priorities of conservation, leak detection and elimination, and increased production can be better established and an improved return on investment achieved.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	1.0			1.0
Budget	Salaries :	14.0			14.0
Source:RAC	Total :	15.0			15.0
	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
Budget	Salaries :				
Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X Contract X Solicited Date : May 27, 1987
INTERNAL Grant Unsolicited X Revision: August 28, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Demonstration of Automated Jar Tester
PROJECT NO: 280C
START DATE: (m/yr): 09/87
RES. PRIORITY:

SHORT TITLE: Automated Jar Tester
MBR PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator and Affiliation: Mr. P. Crawford, Manager, Process System, Zenon Environmental Inc.

LIAISON OFFICER:
(name, location, phone no.) G. Martin - Water Resources Branch, 235-5829

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. To demonstrate and evaluate the automated jar tester in "tracking" operation at water treatment plants.
2. To evaluate the operational data collected, and assess the technical and economic impact of the automated jar test control system on plant operations.
3. To recommend the most appropriate system configuration for on-line demonstration in subsequent phases.

PROJECT DESCRIPTION: Study carried out wherein the automatic jar tester will be demonstrated and evaluated through actual tracking of plant performance in the field. The experimental data collected will be evaluated, and the technical and economic significance of the system will be assessed.

Benefits:
1. Process diagnosis and optimization tool;
2. Lower labour requirements for plant operations, monitoring and data maintenance;
3. Process control based on automated measurement and feedback;
4. Provide a data base for prevention of unnecessary plant expansion or process changes.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	5.9			5.9
	Salaries :	30.7			30.7
Budget	Total :	36.6			36.6
Source:RAC	Man Years :				
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract X	Solicited	Date : May 27, 1987
INTERNAL	Grant	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Regional Analysis of Low-Flow Characteristics

PROJECT NO: 281C
START DATE: (m/yr): 11/86
RES. PRIORITY:

SHORT TITLE: Low Flow Characteristics

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	H.S. Belore and C. Jarratt Cumming-Cockburn & Associates Ltd.
LIAISON OFFICER: (name, location, phone no.)	Dr. L. Logan - Water Resources Branch 323-4984

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To develop a technique for providing estimates of low-flow characteristics for a watercourse based on the physical parameters of the watershed and to test it on a small sub-area.

PROJECT DESCRIPTION: Develop methodology for regional analysis of low-flow characteristics. Apply and test to small sub-area of Ontario.

By utilizing the relationship developed using the gauged watersheds, the hydrologic characteristics of streamflow can be estimated for any ungauged watersheds within the region.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	5.3	5.0		10.3
	Salaries :	19.7	15.0		34.7
Budget	Total :	25.0	20.0		45.0
Source:RAC	Man Years :				
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X Contract Solicited Date : May 25, 1985
INTERNAL Grant X Unsolicited X Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Study of Some Factors Contributing to the Abundance and Persistence of Green Filament Algal Mats in Acidic Lakes

PROJECT NO: 282G
START DATE: (m/yr): 09/86
RES. PRIORITY:

SHORT TITLE: Algal Mats in Acidic Lakes

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Dr. Pamela Stokes, Department of Botany and Institute for Environmental Studies, University of Toronto

LIAISON OFFICER: (name, location, phone no.) M. Jackson - Water Resources Branch 235-5812

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To provide an explanation for the occurrence and persistence of algal mats in acidified lakes (pH 5.5) and to provide an explanation for the lack of accumulation and persistence of the mats in otherwise comparable habitats in less acidic lakes.

PROJECT DESCRIPTION: Selection of sample sites in two acidic lakes: initial examination of the algal mat community to determine its composition and to evaluate sampling methodology; investigation of the invertebrate fauna of algal mats for presence and activity of grazers.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	5.6	11.2	8.0	24.8
	Salaries :	10.1	24.8	12.1	47.0
Budget	Total :	15.7	36.0	20.1	71.8
Source:RAC	Man Years :	0.4	1.1	0.6	2.1
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X Contract Solicited Date : May 26, 1987
INTERNAL Grant X Unsolicited X Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Effect of Fine Particles on The Respiratory Health of a Cohort of Young People

PROJECT NO: 283G
START DATE: (m/yr): 09/86
RES. PRIORITY:

SHORT TITLE: Respiratory Health

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Dr. L.D. Pengelly and Dr. C.H. Goldsmith, McMaster University

LIAISON OFFICER: (name, location, phone no.) Dr. W. Chan - Air Resources Branch 965-4081

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To obtain epidemiological evidence in support of a fine particle standard based on data already collected using the Andersen 2000 Cascade Impactor.

PROJECT DESCRIPTION: Data on respiratory health, home environmental factors, and exposure to air pollutants (including size of suspended particles) are available for a cohort of 1900 Hamilton secondary school students covering the period from 1979 to 1986. These data will be analysed (in particular data obtained from 1982-1986) to determine the effects of fine particles (as defined using data from a network of Andersen 2000 cascade impactors) on the respiratory health of the cohort.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	18.5	22.1		40.6
	Salaries :	42.8	61.6		104.4
Budget Source:RAC	Total :	61.3	83.7		145.0
	Man Years :	1.8	2.4		4.2
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : May 27, 1987
INTERNAL	Grant X (transfer)	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Development of a Control Strategy to Manage Dynamic Fluctuations in Trace Contaminants in Sewage Treatment Plant Effluents

PROJECT NO: 284C
START DATE: (m/yr): 10/86
RES. PRIORITY:

SHORT TITLE: Sewage Treatment

MER PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator and Affiliation: Dr. H. Melcer, Wastewater Technology Centre Environment Canada

LIAISON OFFICER: (name, location, phone no.) T. Ho - Water Resources Branch 323-4980

INTERNAL PROJECTS
Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): The overall objective is to develop a management strategy aimed at controlling the dynamic variations of trace contaminants in sewage treatment plant (STP) effluents. This strategy will address industrial waste discharge limitations, the impact of internal recycle streams on treatment plant performance and the dynamic response characteristics of treatment plant unit processes to non-steady state loadings of trace contaminants.

PROJECT DESCRIPTION: Critical review of technical literature to compile information with respect to trace contaminants as it pertains to;

i) variability of industrial discharges to municipal sewer systems;
ii) variability of raw influent to STPs and its impact on process performance;
iii) quality and impact of recycle streams on process performance;
iv) dynamic behaviour of treatment processes with respect to trace contaminants.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	60.0			60.0
	Salaries :				
Budget	Total :	60.0			60.0
Source:RAC	Man Years :	0.8			0.8
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):
Wastewater Technology Centre, CCIW, Environment Canada

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract X	Solicited	**Date** : May 28, 1987
INTERNAL	Grant	Unsolicited X	**Revision:** October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Sinter Plant Stack Opacity Preconditioned Spray System

PROJECT NO: 285C
START DATE: (m/yr): 10/86
RES. PRIORITY:

SHORT TITLE: Stack Opacity

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Stelco Inc. Hamilton, Ontario
LIAISON OFFICER: (name, location, phone no.)	J. Vogt - Hamilton District Office (416) 521-7732

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): The objective is to determine the ability of the stelco-designed preconditioned water spray system to reduce sinter stack opacity and fine particle loadings. A bluish haze prevents the plume opacity from meeting MOE requirements. The aim is to achieve 20 percent stack opacity as prescribed by regulation 308.

PROJECT DESCRIPTION: A prototype, Stelco-designed, precondition spray system should improve sinter stack opacity to a level of 20 percent or less. Results are contingent upon the technical/cost effectiveness of the sprays to precondition and agglomerate submicron particle/hydrocarbon for removal at the venturi scrubber.

BUDGET AND RESOURCES:	Year: (* current)	1*	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget Source:RAC	Total :	30.0			30.0
	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X Contract Solicited Date : May 25, 1987
INTERNAL Grant X Unsolicited X Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Methods of Measurement and Speciation of Mercury in Natural Waters and Its use in Assessing Mercury Contamination in Huntsville Area Lakes

PROJECT NO: 286G
START DATE: (m/yr): 10/86
RES. PRIORITY:

SHORT TITLE: Mercury in Natural Waters

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator and Affiliation: Dr. Pamela Stokes, Institute for Environmental Studies University of Toronto

LIAISON OFFICER: (name, location, phone no.) Dr. G. Mierle - Limnology Unit, Dorset (705) 766-2412

INTERNAL PROJECTS
Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To determine the source(s) of mercury and methylmercury to the Huntsville Lakes.

PROJECT DESCRIPTION: Streams, rivers and precipitation in the Huntsville area, will be monitored for mercury and methylmercury to determine the source of contamination to these lakes, and the effect of pH and sulphate changes will be described.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	25.5	6.7		32.2
	Salaries :	56.0	58.8		114.8
Budget	Total :	81.5	65.5		147.0
Source:RAC	Man Years :	2.4	2.4		4.8
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract	Solicited	Date : May 25, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Field Trials of Developed DNA Probes for Determining Bacterial Pollution Source Inputs

PROJECT NO: 287G
START DATE: (m/yr): 10/86
RES. PRIORITY:

SHORT TITLE: DNA Probes

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Dr. W.C. Bradbury, Toronto General Hospital
Univeristy of Toronto

LIAISON OFFICER: (name, location, phone no.) M. Young - Laboratory Services Branch
235-5866

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To determine the specificity in field trials of developed DNA probes (human, goose, gull) to trace and quantitate the sources of pollution at the Toronto Harbour Front.

PROJECT DESCRIPTION: Isolates obtained from MOE Microbiology section laboratory, which have been collected from human, animal and bird feces will be analyzed in a 'Blind' study by the DNA probes. The latter results will be compared with standard biochemical identifications. The DNA analyzed samples will then subsequently be sent back to the MOE microbiology laboratory for 'Blind' confirmation.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	5.0			5.0
	Salaries :	28.6			28.6
Budget Source:RAC	Total :	33.6			33.6
	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract	Solicited	Date : May 26, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 20, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Development and Critical Evaluation of a Dual Column Gas Chromatography Method for the Determination of Polycyclic Aromatic Compounds in Environmental Samples

PROJECT NO: 288G
START DATE: (m/yr): 10/86
RES. PRIORITY:

SHORT TITLE: PAHs in Env. Samples

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. M.A. Quilliam, Department of Chemistry McMaster University*
LIAISON OFFICER: (name, location, phone no.)	J. Osborne - Laboratory Services Branch 235-5759

INTERNAL PROJECTS
Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): The development of a dual-column gas chromatography method for the routine analysis of polycyclic aromatic compounds in environmental samples, using retention indices and either general or selective detectors. The general detectors being a flame ionization (FID) or photo-ionization detector (PID) and the selective detectors being an electron capture (ECD) or a thermionic sensitive detector (TSD). In order to have as efficient protocol, a data base of GC retention indices for various polycyclic compounds will also be produced. Once the method has been developed the degree of confidence associated with the method will be obtained through a critical comparison of its data with that of GC/MS (gas chromatography/mass spectrometry), LC/DAD (liquid chromatography with a UV-VIS diode /array detector) and LC/MS.

PROJECT DESCRIPTION: The chemical composition of environmental samples such as airbone particulates and sediments is very complex, consisting of hundreds of inorganic and organic components. A very important class of compounds in such samples are the polycyclic aromatic hydrocarbons and their derivatives. This project will attempt to develop and evaluate a routine dual-column GC method for the analysis of polycyclic aromatic compounds (PAC) and create a data base of retention indices for PAC identification.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	47.0			47.0
	Salaries :	23.0			23.0
Budget	Total :	70.0			70.0
Source:RAC	Man Years :	1.1			1.1
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: *Principal Investigator - Dr. M. Quilliam left McMaster University in July, 1987 for Environment Canada, Halifax, N.S. See file 288 for further details.

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract X	Solicited	Date : May 27, 1987
INTERNAL	Grant	Unsolicited X	Revision: August 28, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Kirkland Lake Water Treatment Plant Alternative Process Research

PROJECT NO: 289C
START DATE: (m/yr): 01/87
RES. PRIORITY:

SHORT TITLE: Kirkland Lake Water Treatment

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: D.R. Fisher, P. Eng
Proctor & Redfern Limited

LIAISON OFFICER: (name, location, phone no.) G. Martin - Water Resources Branch
235-5829

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. To study and compare alternative high rate pre-treatment processes with each other and with known operating data from other plants using conventional low rate systems.
2. To study alternative coagulants on Northern Ontario waters.

PROJECT DESCRIPTION: Pilot studies of various high rate pre-treatment processes in conjunction with different filtration media gradations at varying filter rates and using alternative pre-treatment and coagulant chemicals.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	31.0			31.0
	Salaries :	38.0			38.0
Budget	Total :	69.0			69.0
Source:RAC	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract	Solicited	Date : May 26, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Nature of Substrates in Industrial Wastes Relative to Elemental Leachability

PROJECT NO: 290G
START DATE: (m/yr): 10/86
RES. PRIORITY:

SHORT TITLE: Elemental Leachability

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. J.R. Kramer, Department of Geology McMaster University
LIAISON OFFICER: (name, location, phone no.)	Dr. J. Pimenta - Laboratory Services Branch 235-5854

INTERNAL PROJECTS

Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): The overall objective of the study is to use the characterization of the solid phases of industrial wastes to determine their metal leachability and hence to be able to specify the environmental conditions required for stabilization and disposal.

PROJECT DESCRIPTION: 1. Characterization of the solid phases of wastes by X-ray Diffraction, Electron Microscopy and selective extraction;
2. Determination of kinetics of metal leachability from industrial wastes;
3. Protocol development for classification of industrial wastes based upon their toxic metal stability which is based upon their solid phases.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	6.5	9.3	9.7	25.5
	Salaries :	23.5	23.9	24.5	71.9
Budget	Total :	30.0	33.2	34.2	97.4
Source:RAC	Man Years :	1.0	1.0	1.0	3.0
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract X	Solicited	Date : May 27, 1987
INTERNAL	Grant	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: A Field Evaluation of the Overland Flow Method for the Removal of Organic Compounds from Groundwater

PROJECT NO: 291C
START DATE: (m/yr): 03/87
RES. PRIORITY:

SHORT TITLE: Overland Flow Method

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Derek P. Smith, Project Manager
Water and Earth Science Associates Ltd.

LIAISON OFFICER: (name, location, phone no.) D. Cook - MOE (SE Region)
(613) 549-4000

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): Provide a proven low cost treatment alternative for part per billion range volatile, non-volatile, organic compounds derived from groundwater remedial sites. Concentrations must be reduced to levels acceptable for surface discharge into receiving water bodies. The system will also provide a means by which iron may be eliminated from discharge streams without expensive pre-treatment.

PROJECT DESCRIPTION: An overland flow treatment system will be developed at the site of an existing gasoline spill. Low, but carcinogenic levels of benzene and PAH compounds have been detected in the groundwater. Organic chemicals and iron will be removed from groundwater pumped from an existing purge well at a flow rate of 50 to 80 IGPM, a rate sufficient to control further spread of the plume. Organic removal will be affected by a combination of processes including iron scavanging, and bio consumption by introduced macro and microphytes.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	15.0			15.0
	Salaries :				
Budget Source:RAC	Total :	15.0			15.0
	Man Years :	0.8			0.8
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract X	Solicited	Date : May 29, 1987
INTERNAL	Grant	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: To Conduct A Study on the Structure of the Liquid Waste Management (Transportation) Sector in Ontario

PROJECT NO: 293C
START DATE: (m/yr): 02/87
RES. PRIORITY:

SHORT TITLE: Liquid Waste Management

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator and Affiliation: A. Donner, ARA Consultants Ltd.

LIAISON OFFICER: (name, location, phone no.) Dr. J. Donnan - Policy and Planning Branch 323-4579

INTERNAL PROJECTS
Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): Determine, the physical, economic and financial characteristics of the liquid industrial waste haulage industry in Ontario. Included will be a review of Provincial environmental and liscensing regulations on performance and cost effectiveness of the industry.

PROJECT DESCRIPTION: This accessed a number of information sources to develop the relevant information about the Industrial Liquid Waste Transportation Industry in Ontario. The sizes, ownership, location, cost structure and other characteristics of this industry and its component firms are presented.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	2.2			2.2
	Salaries :	30.1			30.1
Budget	Total :	32.3			32.3
Source:RAC	Man Years :				
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : May 25, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: A Chromogenic Reagent for the Detection of E. Coli	PROJECT NO: 295G START DATE: (m/yr): 11/86 RES. PRIORITY:
SHORT TITLE: Chromogenic Reagent/E. Coli	MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. S. Wolfe, Department of Chemistry Queen's University
LIAISON OFFICER: (name, location, phone no.)	Dr. A. Ley, S.E. Region (Kingston Laboratory) (613) 549-4000

INTERNAL PROJECTS

Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): This new bacteriological technique has involved co-operation between Dr. Wolfe and microbiology staff of Southeastern Region - may constitute a breakthrough in bacteriological testing due to its high degree of specificity for E. Coli.

PROJECT DESCRIPTION: 1. An outline of the total organic synthesis of indoxyl-B-D-glucuronide (IBG).

2. A laboratory scale protocol, suitable for the synthesis of IBG will be developed, and 10 grams of indoxyl-B-D-glucuronide (95% purity) will be produced for MOE use.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	10.1			10.1
	Salaries :	12.0			12.0
Budget	Total :	22.1			22.1
Source:RAC	Man Years :	0.8			0.8
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract X	Solicited	Date : May 27, 1986
INTERNAL	Grant	Unsolicited X	Revision: August 28, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Slow Sand Filtration for Production of Drinking Water in Small Northern Communities

PROJECT NO: 296C
START DATE: (m/yr): 11/86
RES. PRIORITY:

SHORT TITLE: Slow Sand Filtration

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	W.J. Hargrave, P. Eng. Gore & Storrie Limited
LIAISON OFFICER: (name, location, phone no.)	J. Dart - Water Resources Branch 323-4876

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To investigate the design, operation and maintenance of slow sand filtration for the treatment of drinking water in small northern communities.

PROJECT DESCRIPTION: 1. To assemble design, operation, maintenance and cost information on slow sand filtration.
2. To evaluate simple chemical dosing systems, the potential colour removal, and to propose pilot test programs.

Successful completion of the study will provide information on design and operation of slow sand filtration systems.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	5.0	21.0	2.5	28.5
	Salaries :	20.0	79.0	22.5	121.5
Budget	Total :	25.0	100.0	25.0	150.0
Source:RAC	Man Years :	0.5	0.9	0.3	1.7
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL Contract Solicited Date : May 28, 1987
INTERNAL X Grant Unsolicited Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: An Evaluation of A Sampling Scheme Using Hi-Vol/Sorbent Cartridge for Sampling of Dioxins/Furans in Ambient Air in Ontario

PROJECT NO: 297C
START DATE: (m/yr): 04/86
RES. PRIORITY:

SHORT TITLE: Dioxins/Furans in Ambient Air

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator and Affiliation:

LIAISON OFFICER:
(name, location, phone no.)

INTERNAL PROJECTS
Principal Investigator: (name, location, phone no.) A. Szakolcai
Air Resources Branch 965-4081

SUPERVISOR: W.H. Chan

OBJECTIVE(S): 1. To evaluate a Hi-Vol/PUF sorbent sampler for dioxins/furans in ambient air.
2. To evaluate optimum flow rate, sampling efficiencies and precision for sampling dioxins/furans in ambient air.
3. To obtain preliminary air concentration data of dioxins/furans at selected locations in Ontario.

PROJECT DESCRIPTION: A sampler using Hi-vol and PUF sorbent will be evaluated under field conditions for measurements of dioxins and furans. Experiments will be carried out to determine retention and recovery efficiencies, optimum operational conditions and preliminary dioxins/furans concentration in Ontario ambient air.

This project is part of the integrated "Ecosystem Approach to the Monitoring of Organic Contaminants and their Environmental Effects" which is coordinated by Hazardous Contaminants Coordination Branch.

BUDGET AND RESOURCES:	Year: (* current)	1	2 *	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:	133.1			133.1
	Salaries :				
Budget	Total :	133.1			133.1
Source:RAC	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1987

EXTERNAL PARTICIPATION (ministries, governments, agencies):
Lab Services Branch - Ministry of the Environment

COMMENTS: Contract to be tendered

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL Contract Solicited Date : May 28, 1987
INTERNAL X Grant Unsolicited Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: An Evaluation of a Hi-Vol/Denuder/Sorbent Sampling Scheme for Measurements of Polynuclear Aromatic Hydrocarbons (PAHs) in Ontario

PROJECT NO: 298C
START DATE: (m/yr): 04/86
RES. PRIORITY:

SHORT TITLE: PAH Samplings

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator
and Affiliation:

LIAISON OFFICER:
(name, location, phone no.)

INTERNAL PROJECTS
Principal Investigator: G. Diamond
(name, location, phone no.) Air Resources Branch, 965-4081

SUPERVISOR: W. H. Chan

OBJECTIVE(S): 1. To evaluate a new PAH sampling scheme in the field.
2. To evaluate comparability of results obtained by sampling with and without denuders in the filtration scheme.
3. To determine precision using the proposed sampling scheme.
4. To obtain preliminary air concentration data of PAHs at selected sites in Ontario and in different seasons.

PROJECT DESCRIPTION: A sampling scheme employing denuder/hi-vol/sorbent will be tested under field conditions for measurements of PAHs at three sites in Ontario for about 1 year. Precision information will also be obtained using parallel samplers.

This project is part of the integrated "Ecosystem Approach to the Monitoring of Organic Contaminants and their Environmental Effects" which is co-ordinated by Hazardous Contaminants Coordination Branch.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:	105.0			105.0
	Salaries :				
Budget	Total :				
Source: RAC	Man Years :				

OUTPUT (papers, presentations, reports):
Poster presented at Tech. Trans. Conf., 1987

EXTERNAL PARTICIPATION (ministries, governments, agencies):
Lab Services Branch - Ministry of the Environment

COMMENTS: Contract to be tendered

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.),

EXTERNAL X Contract Solicited
INTERNAL Grant X Unsolicited X

Date : May 28, 1987
Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Clay/Leachate Compatibility Study Hydraulic Conductivity of Ottawa-Carleton "Leda" Clay Barrier Soils Permeated with Domestic Waste Leachate

PROJECT NO: 299C
START DATE: (m/yr): 03/87
RES. PRIORITY:

SHORT TITLE: Domestic Leachates

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. R.M. Quigley, Director of Geotechnical Research Centre University of Western Ontario
LIAISON OFFICER: (name, location, phone no.)	R. Dunn - MOE (SE Region) (613) 521-3450

INTERNAL PROJECTS

Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To assess the compatibility of four Leda Clay samples (from the Ottawa-Carleton region) with typical domestic waste leachate. The work would be used as input for environmental hearings associated with selection of future landfill sites on leda clay. The work was requested by MacLaren Engineers at the request of the Ontario Ministry of the Environment.

PROJECT DESCRIPTION: Four "typical" Leda clay samples would be supplied by Golder Associates (Ottawa) under the supervision of MacLaren Engineers. These samples would be subjected to permeation by domestic waste leachate to assess any changes in hydraulic conductivity. Extensive chemical analyses of both the influent and effluent liquids would indicate any retardation of selected soluble species.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	25.0			25.0
	Salaries :				
Budget Source:RAC	Total :	25.0			25.0
	Man Years :	0.4			0.4
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : May 26, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: An Intrinsic Chemically Selective Lipid-Based Wave Guide Organic Vapour Sensor

PROJECT NO: 300G
START DATE: (m/yr): 02/87
RES. PRIORITY:

SHORT TITLE: Organic Vapour Sensor

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Dr. U.J. Krull, Department of Chemistry
Erindale College, University of Toronto

LIAISON OFFICER:
(name, location, phone no.) Dr. E. Singer - Air Resources Branch
965-4081

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To prepare and study a novel integral optical sensor consisting of a chemically selective fluorescent lipid biomembrane which acts as a light guide. This system will be developed with the capability of being portable or remote, and will be able to provide sensitive long term detection of organic species of environmental significance.

PROJECT DESCRIPTION: A lipid membrane prepared as a multilayer of monolayer lipid films would be used as an optical wave guide using the principle of total internal reflection. The lipid matrix would be modified to contain an organic receptor, which would alter membrane physical chemistry as a result of selective binding. The alterations would be repored by fluorophores sensitive to membrane or receptor structure. This system would be inherently sensitive due to the sensitivity of fluorophore response, and the fact that the fluorescent signal would originate within the wave guide.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	5.0	5.0	5.0	15.0
	Salaries :	6.5	6.5	6.5	19.5
Budget	Total :	11.5	11.5	11.5	34.5
Source:RAC	Man Years :				4.1
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract X	Solicited	Date : May 27, 1987
INTERNAL	Grant	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Fossil Chrysophycean Cyst Assemblages as Paleoindicators in Acidified Lakes

PROJECT NO: 301G
START DATE: (m/yr): 02/87
RES. PRIORITY:

SHORT TITLE: Paleoindicators

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. Marijsz Rybak Aquatic Research & Ecological Consultants
LIAISON OFFICER: (name, location, phone no.)	K. Nicholls - Water Resources Branch 235-5810

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S):- to establish new predictive techniques for reconstruction of long-term changes of pH and related chemistry in the lakes in the Province of Ontario.
-To describe chrysophycean fossil cyst assemblages from 52 lakes in Ontario.
-To analyze the relationship between chrysophycean cyst assemblages and lake water pH.
-To develop transfer functions
-To determine the concentration of major oxides and trace elements in sediments.
-To develop a new technique to predict water chemistry characteristics (other than pH in acidified lakes.
-To prepare a guidebook for the identification of chrysophycean fossil cysts.

PROJECT DESCRIPTION: Data will be obtained from analysis of surface sediments of 52 lakes in Ontario. The detailed analysis of fossil chrysophycean cyst assemblages and geochemical analysis will be carried out. The statistical analysis will be used to develop new techniques for reconstruction of long-term changes of pH and related chemistry in the lakes in the Province of Ontario.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	3.2			3.2
	Salaries :	23.3			23.3
Budget	Total :	26.5			26.5
Source:RAC	Man Years :	0.2			0.2
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X Contract X Solicited Date : June 2, 1987
INTERNAL Grant Unsolicited X Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Technical and Economic Assessment of Reverse Osmosis for Treatment of Landfill Leachate

PROJECT NO: 303C
START DATE: (m/yr): 04/87
RES. PRIORITY:

SHORT TITLE: Reverse Osmosis

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: J.A. Coburn, Vice President of Technical Services
Zenon Environmental Inc.

LIAISON OFFICER: (name, location, phone no.) Mr. A. Oda - Waste Management Branch
323-5129

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. To evaluate the technical and economic benefits of reverse osmosis for treatment of landfill leachates.
2. To carry out bench scale studies on landfill samples and to use the results to develop a process design for an optimized membrane-based treatment system.

PROJECT DESCRIPTION: Reverse osmosis technology offers great promise in the area of landfill leachate treatment. The proposed study will establish the technical and economic feasibility and potential economic advantages of membrane technology for this application. Bench scale studies will be carried out on samples collected from a landfill chosen in conjunction with the scientific authority, and results will be used to develop a process design.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	16.5			16.5
	Salaries :	33.1			33.1
Budget	Total :	49.6			49.6
Source:RAC	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : May 26, 1987
INTERNAL	Grant X	Unsolicited X	Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Provision of Isomerically Pure Nitro-PAH Analytical Standards

PROJECT NO: 304G
START DATE: (m/yr): 03/87
RES. PRIORITY:

SHORT TITLE: PAH Analytical Standards

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. V. Snieckus, The Guelph-Waterloo Centre for Graduate Work in Chemistry, University of Waterloo
LIAISON OFFICER: (name, location, phone no.)	Dr. O. Meresz - Laboratory Services Branch 235-5762

INTERNAL PROJECTS

Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. To prepare, by short and efficient routes, several classes of nitro-PAHs, potent direct acting mutagens which are increasingly detected in the environment from a variety of sources. Nitro-PAHs to be prepared are a variety of isomers of: nitrofluorenes, nitrofluoranthenes, nitrophenanthrenes, and nitro benz[a]anthracenes. 2. Similarly, to prepare a series of hydroxylated derivative of the above classes of nitro-PAHs of interest as metabolites and products of atmoshperic photochemical and chemical oxidation. Some of these have already been detected in air particulate extract.

PROJECT DESCRIPTION: The work is based on recent synthetic methodology developed in the researcher's laboratories using transition metal catalyzed cross coupling reaction between arylboronic acids and aryl halides. It will allow the preparation of up to 100 mg quantities of a number of highly pure nitro-PAHs and nitro-hydroxy-PAHs in short time and with minimum handling of potentially toxic intermediates. Analytical purities will be established by HPLC, NMR, HPLC-MS, and GC-MS techniques. Once preparation methods are standardized, the work will be funded by the user Branch.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	5.7			5.7
Budget	Salaries :	31.2			31.2
Source:RAC	Total :	36.9			35.9
	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract X	Solicited	Date : June 8, 1987
INTERNAL	Grant	Unsolicited X	Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Utilization of Established Air Pollution Monitoring Networks in Ontario Following Nuclear Incidents

PROJECT NO: 305C
START DATE: (m/yr): 02/87
RES. PRIORITY:

SHORT TITLE: Air Pollution Monitoring Nuclear Incidents

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	J.A. Bond and S. Linauskas Atomic Energy of Canada Ltd.
LIAISON OFFICER: (name, location, phone no.)	Dr. M.A. Lusis - Air Resources Branch 965-1634

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To evaluate the collection efficiency for organic and elemental iodine species of various grades of activated carbon impregnated glass-fibre filter media, thereby determining its usefulness for airborne radioiodine environmental monitoring.

PROJECT DESCRIPTION: The total length of the study will be approximately 7 months. Sources of commercially available carbon impregnated filter media will be identified and samples obtained. The media's ability to collect methyl iodine and elemental iodine will be determined under varying conditions of temperature, relative humidity, face velocity and adsorbate concentrations.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	4.1			4.1
	Salaries :	28.9			28.9
Budget	Total :	33.0			33.0
Source:RAC	Man Years :	0.3			0.3
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):
Oral presentation at TTC, 1987

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X Contract X Solicited X Date : May 28, 1987
INTERNAL Grant Unsolicited Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: An Evaluation of the Problems of Particulate Emissions from the Wood Products Industry

PROJECT NO: 306C
START DATE: (m/yr):
RES. PRIORITY:

SHORT TITLE: Particulate Emissions from Wood Industry

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator and Affiliation: Rowan, Williams, Davis and Erwin Inc.

LIAISON OFFICER: (name, location, phone no.) R. Potvin - MOE (N.W. Region) (705) 675-4501

INTERNAL PROJECTS
Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To evaluate the problem of airborne particulate matter resulting from the wind erosion of wood particles (shavings, sawdust, chips etc.) from storage/waste piles; and to determine solutions aimed at reducing wind erosion in order to ensure compliance with Regulations 308.

PROJECT DESCRIPTION: The proposed study will take the form of a "literature search" to update current information on this matter, with a summary of what the industry is doing elsewhere and how other government/regulatory agencies are coping with these problems. The report would also provide conclusions/recommendations on the resolution of the problem with the likelihood of a requirement for additional research/study of the problem. These areas of research/study would need to be identified.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :	33.1			33.1
Source:RAC	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract X	Solicited	Date : May 29, 1987
INTERNAL	Grant	Unsolicited X	Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Establishing Vegetation on Erosion-Prone Landfill Slopes in Ontario

PROJECT NO: 307C
START DATE: (m/yr): 02/87
RES. PRIORITY:

SHORT TITLE: Vegetation on Landfill Slopes

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Thomas W. Hilditch, Company Biologist Gartner Lee Associates Ltd.
LIAISON OFFICER: (name, location, phone no.)	D. McLaughlin - Air Resources Branch 965-4516

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To research, test and compile in an understandable and usable form the information and techniques necessary to remediate surface erosion problems through proper vegetation management at landfills across Ontario.

PROJECT DESCRIPTION: The first year of study will include:
- MOE District Abatement Officer Contact and Questionnaires.
- Contact with Revegetation experts in Canada and the United States
- Computer-based Literature Search and Review.
- On-Site Investigations of Selected Landfills Across Ontario.

In year two, experimental test plots using the best available plant species, site treatments and plenty of techniques will be established on 12 representative landfills across Ontario.
The third year of study will be devoted to the monitoring and analysis of test plot results and the creation of the Landfill Revegetation Manual.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	10.3	19.6	11.6	41.5
	Salaries :	39.0	63.5	49.0	151.5
Budget	Total :	49.3	83.1	60.6	193.0
Source:RAC	Man Years :	0.4	0.9	0.7	2.0
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X Contract X Solicited
INTERNAL Grant Unsolicited X

Date : June 3, 1987
Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Enhanced Sanitary Landfill: A Demonstration Trial

PROJECT NO: 308C
START DATE: (m/yr): 04/87
RES. PRIORITY:

SHORT TITLE: Enhanced Sanitary Landfill

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. B. Laughlin, B. Forrestal and P. Laughton Ontario Research Foundation
LIAISON OFFICER: (name, location, phone no.)	A. Oda - Waste Management Branch 323-5129

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): The overall objective of the proposed study is to demonstrate the efficacy of an enhanced landfill concept to permit rapid stabilization and increased capacity for municipal solid waste landfill sites.

PROJECT DESCRIPTION: A pilot scale anaerobic digester will be designed and installed to operate on leachate which is currently being collected at the Britannia Road Sanitary Landfill in Mississauga. The steady state operation phase will include leachate characterization, pilot plant specification and installation, acclimation, steady state operation and data analysis.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	88.0			88.0
	Salaries :	107.0			107.0
Budget	Total :	195.0			195.0
Source:RAC	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	**Contract**	**Solicited**	**Date : June 9,1987**
INTERNAL	**Grant X**	**Unsolicited X**	**Revision: October 6, 1987**

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Detectability of Step Trends in the Rate of Atmospheric Deposition of Sulfate

PROJECT NO: 309G
START DATE: (m/yr): 04/87
RES. PRIORITY:

SHORT TITLE: Deposition of Sulfate

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	**Dr. E.A. McBean, Dept. of Civil Engineering University of Waterloo**
LIAISON OFFICER: (name, location, phone no.)	**N. Reid - Air Resources Branch 965-1634**

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. Develop relationships defining the trade-off between the cost of acid deposition monitoring and time/network requirements to detect step trends in deposition levels.
2. To define the relative deposition variability associated with temporal, spatial and sample collection factors.

PROJECT DESCRIPTION: Comprehensive examination of existing monitoring records to isolate the sources of variability.
Rewrite the variability relationships to solve for the monitoring record duration necessary to recognize step deposition changes.

BUDGET AND RESOURCES:	**Year: (* current)**	**1 ***	**2**	**3**	**TOTAL**
EXTERNAL	**Cost: (000's)**				
PROJECTS	**Operating:**	**3.2**			**3.2**
	Salaries :	**12.0**			**12.0**
Budget	**Total :**	**15.2**			**15.2**
Source:RAC	**Man Years :**				
INTERNAL	**Cost: (000's)**				
PROJECTS	**Operating:**				
	Salaries :				
Budget	**Total :**				
Source:	**Man Years :**				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

**NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)**

EXTERNAL X Contract X Solicited
INTERNAL Grant Unsolicited X

Date : June 29, 1987
Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Scale Model Studies and Development of Prediction Procedures for Heavy Gas Dispersion in Complex Terrain

PROJECT NO: 310C
START DATE: (m/yr): 07/87
RES. PRIORITY:

SHORT TITLE: Gas Dispersion Model

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. P.A. Irwin Rowan, Williams, Davies & Irwin Inc.
LIAISON OFFICER: (name, location, phone no.)	P. Misra - Air Resources Branch 235-5771

INTERNAL PROJECTS

Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To develop a practical model for predicting the dispersion of dense gases that will make appropriate allowances for the effects of surrounding buildings and topography and that incorporates a methodology for predicting peak concentrations.

PROJECT DESCRIPTION: The studies would be in two phases. Phase I consists of a Literature Review, Theorectical Studies, Wind Tunnel Tests and Computer Program Development for cases involving uniform arrays of obstacles such as buildings. Phase II will extend the studies to non-uniform arrays of obstacles and will also look at the effects of ground slope, ditches, berms, etc. Since the full range of all possible terrain conditions cannot possibly be covered, a part of the studies will be to evaluate the uncertainties in the predictions to arrive at rational safety factors to use in conjunction with the predictions.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	79.0	92.0		171.0
Budget	Salaries :	23.0	26.0		49.0
Source:RAC	Total :	102.0	118.0		220.0
	Man Years :	0.8	1.0		1.8
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	**Contract**	**Solicited**	**Date : June 8, 1987**
INTERNAL	**Grant X**	**Unsolicited X**	**Revision: October 6, 1987**

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Development of Multivariate analysis procedures for Ontario Air Quality Data

PROJECT NO: 311G
START DATE: (m/yr): 04/87
RES. PRIORITY:

SHORT TITLE: Multivariate Analysis for Air Quality

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Dr. Philip K. Hopke, Institute for Environmental Studies University of Illinois at Urbana-Champaign

LIAISON OFFICER: (name, location, phone no.) Dr. W. Chan - Air Resources Branch 965-4081

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. To determine if multivariate data analysis methods can extract evidence for long-range transport of acidic materials influencing the precipitation chemistry of samples collected by APIOS network.

2. The establishment of a set of data analysis procedures to be applied to these data as they are accumulated so that such information can be routinely extracted as part of the on-going data interpretation efforts.

3. The ability of target transformation factor analysis for extraction of source information for urban scale aerosol will be explored and, if successful, procedures will be established to incorporate this methodology in the techniques available to MOE for air quality management.

PROJECT DESCRIPTION: Various multivariate data analytical methods including nonhierarchical cluster analysis, principal components analysis, empirical orthogonal function, and three-mode principal components analysis will be applied to precipitation chemistry data and appropriate meteorological data to elucidate the origins of the observed components. In addition, the sources of urban particulate matter will be explored using principal components analysis and target transformation factor analysis.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (US$000's)				
PROJECTS	Operating:	15.8	16.5		32.3
	Salaries :	12.0	13.1		25.1
Budget	Total :	27.8	29.6		57.4
Source:RAC	Man Years :	.5	.5		1.0
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):
Oral presentation at TTC, 1987

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract	Solicited	Date : June 8, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Modelling the Photochemical Decomposition of Chlorinated Phenols by Sunlight

PROJECT NO: 312G
START DATE: (m/yr): 04/87
RES. PRIORITY:

SHORT TITLE: Photochemical Decomposition of Phenols

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator and Affiliation: Dr. Nigel J. Bunce, Dept. of Chemistry
University of Guelph

LIAISON OFFICER: (name, location, phone no.) N. Reid - Air Resources Branch
965-1634

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. To model the rate of decomposition of chlorophenols in the troposphere as assisted by sunlight;
2. To identify the products of the above photochemical degradation;
3. To establish the mechanisms by which these reactions take place.

PROJECT DESCRIPTION: This study consists of several parts, corresponding to the objectives above. The foremost question is to demonstrate whether chlorophenols degrade under sunlight and if so, how fast this reaction occurs environmentally. Following this, the reaction products will be investigated using GC-MS, and finally the reaction mechanism will be investigated using chemical trapping experiments.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	2.6	3.0		5.6
	Salaries :	7.8	7.8		15.6
Budget	Total :	10.4	10.8		21.2
Source:RAC	Man Years :	.6	.6		1.2
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : June 8, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Physical and Chemical Processes affecting Long-Range Transport of Air Pollutants and Acid Rain

PROJECT NO: 313G
START DATE: (m/yr): 08/87
RES. PRIORITY:

SHORT TITLE: Processes Affecting LRTAP

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. Han-Ru Cho, Department of Physics University of Toronto
LIAISON OFFICER: (name, location, phone no.)	R. Bloxam - Air Resources Branch 235-5772

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To gain better understanding of chemical, physical and dynamic processes in the earth's atmoshphere affecting long-range transport of air pollutants and acid rain.

PROJECT DESCRIPTION: Some basic problems in chemical, physical and dynamic processes important to the modelling of long-range transport and acid rain will be studied. Emphasis will be placed on mesoscale atmospheric processes, and the possibility of incorporating them into long-range transport models.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	14.5	23.0	23.0	60.5
	Salaries :	59.7	83.6	87.8	231.1
Budget	Total :	74.2	106.6	110.8	291.6
Source:RAC	Man Years :	2.2	2.8	2.8	7.8
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : June 8, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Atmospheric Trace Gas Measurements using a Tunable Diode Laser Absorption Spectrometer

PROJECT NO: 314G
START DATE: (m/yr): 04/87
RES. PRIORITY:

SHORT TITLE: Tunable Diode Laser Spectrometer

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Drs. D.R. Hastie and H.I. Schiff, Faculty of Science, York University

LIAISON OFFICER: (name, location, phone no.) Dr. M. Lusis - Air Resources Branch 965-1634

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To make measurements of atmospheric trace gas concentrations to aid in the understanding of the chemistry of both ozone and acid formation. The data will be directly applicable for evaluation of Eulerian models (RADM, and ADOM). The proposed measurments will be part of the Eulerian model evaluation study jointly sponsored by MOE, AES and USEPA.

PROJECT DESCRIPTION: The bulk of the measurment program will be related to the Eulerian Model Field Evaluation Study. For this the TDLAS will be located at the Ministry's site at Dorset for a total of four two-month periods so as to cover the four seasons within two years. The instrument will be capable of measuring the concentrations of two species simultaneously, the exact species to be measured will be selected in conjunction with Ministry personnel. The instrument should be available for other Ministry special projects as required, provided the aims of the Evaluation Study are not compromised.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	398.4	46.5	44.5	489.4
Budget	Salaries :	74.1	74.1	74.1	222.3
Source:RAC	Total :	472.5	120.6	118.6	711.7
	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
Budget	Salaries :				
Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):
Atmospheric Environment Services - Environment Canada, and US - EPA

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X **Contract** **Solicited** **Date :** June 8, 1987
INTERNAL **Grant** X **Unsolicited** X **Revision:** October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: The effects of Forestry Operations upon the Environment of Ontario

PROJECT NO: 315G
START DATE: (m/yr): 04/87
RES. PRIORITY:

SHORT TITLE: Forestry Operations

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Don Huff The Federation of Ontario Naturalists
LIAISON OFFICER: (name, location, phone no.)	W. McIlveen - Air Resource Branch 965-4516

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To review relevant literature, concepts and practices pertaining to the environmental effects of forestry operations focussing in particular on the ecosystem dynamics, chemicals used in forestry operations and on economic ramifications. To also establish and assess the economic and social cause and effect linkage between these environmental effects.

PROJECT DESCRIPTION: The work will be guided by a Peer Review Committee, composed of academics and or consultants, a project coordinator, and a member of the Federation of Ontario Naturalists. Four contracts will be carried out to provide information on ecosystem dynamics, chemicals, air and water quality, socio-economic and cultural aspects, economic implications, and environmental progress. Each contract will comprehensively review and evaluate the literature and current practices and will be synthesized to form one final report, outlining the state of the environment as it relates to forestry operations.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	76.0			76.0
	Salaries :	24.0			24.0
Budget	Total :	100.0			100.0
Source:RAC	Man Years :	1.0			1.0
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, MER etc.)

EXTERNAL X	Contract X	Solicited	Date : June 8, 1987
INTERNAL	Grant	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: A Study of the Economic Factors Relating to the Implementation of Resource Recovery, Recycling or Zero-Discharge Waste Reduction Technologies for Heavy Metal Generating Industries in Canada

PROJECT NO: 316G
START DATE: (m/yr): 04/87
RES. PRIORITY:

SHORT TITLE: Heavy Metal Industries

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. Bernard Fleet, Dept. of Chemistry University of Toronto
LIAISON OFFICER: (name, location, phone no.)	R. Warner - Waste Management Branch 323-5196

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): The study will provide an evaluation of the economics of recycling technologies specifically aimed at some key industrial sources of pollution, namely the metal finishing, printed circuit board and related electronic industries. The concepts, technologies and systems should also be transferrable to a significant segment of Ontario's mining industry.

PROJECT DESCRIPTION: The economic studies would first involve an evaluation of the costs for various technologies to achieve specific levels of treatment efficiency. Secondly, an economic model would be developed which would allow comparison of recycling vs conventional treatment costs and wuold provide sensitivity analysis to allow effect of various factors to be evaluated. Thirdly, a cost comparison of various strategies for implementation of a given recycling technology would be presented. Finally, three case studies would be carried out to apply practical utilization of economic data to development of optimal waste management strategies.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	49.3			49.3
	Salaries :	27.2			27.2
Budget	Total :	76.5			76.5
Source:RAC	Man Years :	1.2			1.2
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : June 8, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Quantitative Structure-Activity Relationships for Organic Compounds and their mixture

PROJECT NO: 317G
START DATE: (m/yr): 04/87
RES. PRIORITY:

SHORT TITLE: QSAR for Organics

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Dr. George W. Ozburn and L. McCarty, Dept. of Biology Lakehead University

LIAISON OFFICER: (name, location, phone no.) N. Bazinet - Water Resource Branch 323-4929

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To enhance and refine QSAR techniques employing the organic chemical toxicity database at Lakehead University. To develop physiologically and environmentally realistic toxicity models using Lakehead and literature data.

PROJECT DESCRIPTION: Use the organic chemical database of Lakehead University's ATRG in conjuction with literature information to:

1. Refine and expand relationships between molecular descriptors, acute and chronic aquatic toxicity test results, and bioconcentration;
2. Investigate biological and environmental factors which may influence the accurate determination of the above relationships and examine methods of compensation and correction;
3. Study data and relationships and develop simple one-compartment first-order kinetics models for the prediction of toxicant body burdens and the time course of toxicant action;
4. Examine the possibility of using more sophisticated modelling techniques to improve predictive capabilities and incorporate provisions for mixtures of toxicants as well as accounting for certain biological and environmental factors which may influence the outcome.

BUDGET AND RESOURCES:	**Year: (* current)**	**1 ***	**2**	**3**	**TOTAL**
EXTERNAL	**Cost: (000's)**				
PROJECTS	**Operating:**	18.2	8.7	7.7	34.6
	Salaries :	25.1	43.0	32.3	100.3
Budget	**Total :**	43.3	51.7	40.0	134.9
Source:RAC	**Man Years :**	.7	1.0	.3	2.0
INTERNAL	**Cost: (000's)**				
PROJECTS	**Operating:**				
	Salaries :				
Budget	**Total :**				
Source:	**Man Years :**				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract	Solicited	Date : June 8, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: The Long-Term Effects of Acute and Sub-chronic Pentachlorphenol Exposures on the Growth and Lipid Reserves of Centrarchid Fish

PROJECT NO: 318G
START DATE: (m/yr): 04/87
RES. PRIORITY:

SHORT TITLE: Pentachlorphenol Exposure

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator and Affiliation: Dr. Peter H. Johansen, Department of Biology Queen's University

LIAISON OFFICER: (name, location, phone no.) G. Westlake - Water Resource Branch 235-5797

INTERNAL PROJECTS
Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To determine the effects of pentachlorophenol exposure (chronic and acute) to growth and lipid reserves of centrachid fish over a several week period upon return to uncontaminated water.

PROJECT DESCRIPTION: In the first year investigator will develop the food conversion efficiency feeding technique around a new food item not previously used by the investigator and hopefully complete the acute and sub-chronic exposure experiments. The experimental season, when small bluegill sunfish are available, is limited to 6 to 9 months.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	7.3	4.4		11.7
Budget	Salaries :	6.0	6.0		12.0
Source: RAC	Total :	13.3	10.4		23.7
	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract X	Solicited	Date : June 8, 1987
INTERNAL	Grant	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: To Investigate, Evaluate and Recommend Organisms as Biomonitoring Tools for Procedures Development for Monitoring of Site-Specific Industrial, and Municipal Discharges and Non-Point Sources

PROJECT NO: 319C
START DATE: (m/yr): 05/87
RES. PRIORITY:

SHORT TITLE: Biomonitoring of Industrial & Municipal Discharges

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Catherine Jefferson Curry Jefferson Environmental Services
LIAISON OFFICER: (name, location, phone no.)	A. Hayton - Water Resources Branch 235-5803

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): By means of literature review, provide a data base on biomonitoring organisms to provide guidance as to which organisms are best for specific situations and provide direction for new biomonitoring candidates.

PROJECT DESCRIPTION: Literature review of published and unpublished information related to biomonitoring and organisms used in particular industrial, municipal and non-point source monitoring programs. This may result in recommendations for changes to MOE monitoring programs or to selection of different biomonitoring organisms for testing discharges.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	1.9			1.9
	Salaries :	11.5			11.5
Budget	Total :	13.4			13.4
Source:RAC	Man Years :	0.2			0.2
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X Contract Solicited
INTERNAL Grant X Unsolicited X

Date : June 8, 1987
Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: An Examination of the Chronic Toxicity of Thocyanate to Freshwater Fish for the Development of a Water Quality Criterion

PROJECT NO: 320G
START DATE: (m/yr): 04/87
RES. PRIORITY:

SHORT TITLE: Chronic Toxicity

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. D. George Dixon, Assistant Professor Department of Biology, University of Waterloo
LIAISON OFFICER: (name, location, phone no.)	G. Westlake - Water Resource Branch 235-5797

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To obtain sufficient data on the chronic toxicity of thiocyanate to fish to establish a water quality criterion. To examine the toxicity of short-term pulse exposure of SCN- to fish. To apply the lab derived biochemical and histological indicators of SCN- impact on fish in the White River system.

PROJECT DESCRIPTION: The objectives will be met by four experiments. First, groups of rainbow trout will be continously exposed to sublethal concentrations of SCN- for 16 weeks. Toxicity will be assessed in terms of growth, thyroid metabolism and SCN- kinetics in blood plasma. The second experiment will determine the effects of continuous exposure to SCN-, over one life cycle, on the reproductive capacity of fathead minnow. Experiment three will pulse-expose rainbow trout for 2 h to varying concentrations of SCN-, after which they will be reared for 6 weeks. Toxicity will be assessed as in experiment one to facilitate comparison. All results will be analzed to determine no effect levels. Finally, we will assess the health of white sucker populations in lakes of the White River System of Ontario receiving SCN- effluent. Assessment will be made in terms of age-size, reproduction, histopathology and thyroid metabolism.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	9.9	11.7	14.8	36.4
Budget	Salaries :	25.1	25.1	25.1	75.3
Source:RAC	Total :	35.0	36.8	39.9	111.7
	Man Years :	2.0	2.0	2.0	6.0
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract	Solicited	Date : June 8, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: The Effects of Agricultural Drainage on Sediment and Water Quality Loadings

PROJECT NO: 321G
START DATE: (m/yr): 04/87
RES. PRIORITY:

SHORT TITLE: Effects of Drainage

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. W. Edgar Watt, Dept. of Civil Engineering Queen's University
LIAISON OFFICER: (name, location, phone no.)	Dr. L. Logan - Water Resource Branch 323-4984

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To develop, calibrate and verify a model to simulate the effects of agricultural land use and drainage on the sediment and water quality loadings to receiving streams. To provide guidance on the use of the model to evaluate potential management strategies.

PROJECT DESCRIPTION: This study involves (i) the development, calibration and testing of a physically-based model for predicting sediment and water quality/loadings to receiving waters from agricultural lands; (ii) instrumentation of fields and sub-basins in an agricultural basin; (iii) associated field studies and (iv) applications of the model to assessment of hypothetical management practices affecting water quality.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	9.5	6.5	5.5	21.5
	Salaries :	21.5	23.5	23.5	68.5
Budget	Total :	31.0	30.0	29.0	90.0
Source:RAC	Man Years :	1.0	1.2	1.2	3.4
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X Contract Solicited
INTERNAL Grant x Unsolicited X

Date : June 8, 1987
Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Biomonitoring Protocols for Adult Aquatic Insects

PROJECT NO: 322G
START DATE: (m/yr): 04/87
RES. PRIORITY:

SHORT TITLE: Aquatic Insects

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Dr. Jan J.H. Ciborowski, Department of Biological Sciences University of Windsor

LIAISON OFFICER: (name, location, phone no.) A. Hayton - Water Resources Branch 235-5803

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To develop procedures to collect adult insects to assess the degree of contamination of waters from which they have emerged. To evaluate seasonal variations in contaminants in the Huron-Erie connecting channel. To assess the transfer of contaminants from aquatic to terrestrial systems via adult insects.

PROJECT DESCRIPTION: Research will develop efficient unmanned modes of trapping adult insects. Collections and analyses will evaluate appropriate sample sizes required for adequate detection of contaminants, likely distances from source that insects are attracted and optimal season for collection.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	31.6	31.3		62.9
	Salaries :	7.0	7.0		14.0
Budget	Total :	38.6	38.3		76.9
Source:RAC	Man Years :	1.2	1.3		2.5
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X Contract Solicited Date : June 8, 1987
INTERNAL Grant x Unsolicited X Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Development of Liquid Crystal Capillary Columns for Analysis of Polychlorinated Dioxins and Furans by GC/MS

PROJECT NO: 323G
START DATE: (m/yr): 04/87
RES. PRIORITY:

SHORT TITLE: Crystal Capillary Columns

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. F.W. Karasek, Dept. of Chemistry University of Waterloo
LIAISON OFFICER: (name, location, phone no.)	Dr. R. Clement - Laboratory Services Branch 235--5896

INTERNAL PROJECTS

Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): Under this project, work will be undertaken to develop the selective liquid crystal phases and fabricate capillary columns for separation of PCDDs, PCDFs and PAHs in environmental mixtures.

PROJECT DESCRIPTION: A direct analysis of environmental samples by GC/MS needs selective capillary columns. Liquid crystals are the selective stationary phases that have shown high selectivity for separation of various structural isomers, polyaromatic compounds (PAC) and 2,3,7,8-tetrachlorodibenzo-p-dioxin, that is not possible using conventional capillary columns. However, such polymeric liquid crystal capillary columns are not readily available. Liquid crystalline polymer stationary phases having polysiloxane and polyarcrylate backbones with liquid crystalline moeities as side chains will be developed for capillary columns. The selectivity of such columns will be determined using standard isomeric mixtures that are impossible to separate on conventional capillary columns. The correlation between the structure of liquid crystalline polymer and its selectivity will be established. The newly developed columns will be applied to the analysis of environmental samples.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	16.5			16.5
	Salaries :	26.0			26.0
Budget	Total :	42.5			42.5
Source:RAC	Man Years :	1.1			1.1
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X　Contract　Solicited　Date : June 8, 1987
INTERNAL　Grant X　Unsolicited X　Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Procedure for the 2,3,7,8-Subsituted Analysis of PCDD, PCDF and Other Target Compounds in Environmental Samples

PROJECT NO: 324G
START DATE: (m/yr): 04/87
RES. PRIORITY:

SHORT TITLE: Procedures-Target Compounds, Dioxins, Furans

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Dr. F.W. Karasek, Dept. of Chemistry University of Waterloo

LIAISON OFFICER: (name, location, phone no.) Ms. C. Tashiro - Laboratory Service Branch 235-5897

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): The present method of analysis of PCDD and PCDF does not provide sufficient separation of the most toxic isomers of these compounds. This proposal will utilize a two-step high performance liquid chromatographic fractionation to replace the present multi-step liquid chromatographic procedure. Once the method has been optimized to separate quantitatively the 2,3,7,8-substituted isomers it will also provide simultaneous determination of a wide variety of other organic pollutants.

PROJECT DESCRIPTION: The two-step HPLC fractionation procedure developed for project 210 PL will be rigorously optimized and tested for the analysis of the 2,3,7,8-substituted PCDD and PCDF in a variety of samples supplied by MOE. A large number of samples will be studied in order to optimize the fractionation procedure for the routine analysis of target compounds including PCDD, PCDF, PCB, pesticides, and polycyclic aromatic hydrocarbons (PAH). Ultimately the HPLC method will be designed such that it will be amenable to automated analysis. Upon finalization of the method, MOE will receive a working HPLC and their staff will be trained to complete the technology transfer of the HPLC procedure. Criteria will be established for the identification and determination of 2,3,7,8-TCDD, 2,3,7,9-TCDF, and various other target compounds found in the samples analyzed.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	68.5			68.5
Budget	Salaries :	23.5			23.5
Source:RAC	Total :	92.0			92.0
	Man Years :	1.1			1.1
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
Budget	Salaries :				
Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X Contract Solicited Date : June 8, 1987
INTERNAL Grant X Unsolicited X Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Preparation of Heterocyclic Polynuclear Aromatic Hydrocarbons for Analytical Standards

PROJECT NO: 325G
START DATE: (m/yr): 04/87
RES. PRIORITY:

SHORT TITLE: PAH Synthesis

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator and Affiliation: Dr. E. Lee Ruff, Department of Chemistry York University

LIAISON OFFICER: (name, location, phone no.) J. Osborne - Laboratory Services 235-5759

INTERNAL PROJECTS
Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To prepare specific thiophene and carbazole PAH's that are related to mutagenic carbocyclic analogues for reference standards in environmental analysis. Once these compounds are synthesized the second portion of the project will be to monitor the fate of these compounds under simulated environmental oxidations, providing information on their relative stability.

PROJECT DESCRIPTION: The synthesis of the compounds are based on two independent methods involving cyclobutanones and arylmethyl cations substituted by a thiocarbonyl group which were developed by the investigator. The preparation of the triophenes is based on the latter whereas the carbazole preparation is based on the former route. Furthermore, the synthesized thiophenes will be subjected to controlled simulated environmental conditions. This will involve primarily self-sensitized photooxidation studies.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	4.0	4.0		8.0
	Salaries :	20.0	20.0		40.0
Budget	Total :	24.0	24.0		48.0
Source:RAC	Man Years :				
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract	Solicited	Date : June 8, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: An Expert System for Quality Assurance in Analytical Chemistry

PROJECT NO: 326G
START DATE: (m/yr): 04/87
RES. PRIORITY:

SHORT TITLE: Expert System for QA/QC

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. Martin J. Stillman, Department of Chemistry University of Western Ontario
LIAISON OFFICER: (name, location, phone no.)	Dr. J. Hipfner - Laboratory Services Branch 235-5856

INTERNAL PROJECTS

Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): The development of a generic expert system for use as a quality control and quality assurance program in the analytical laboratory. The study will involve the design and implementation of a prototype system software.

PROJECT DESCRIPTION:

- Designing prototype expert systems software
  - designing rule and knowledge databases structure
  - designing user interface
  - designing a general instrument communication interface
- Designing instrumental analysis quality control programs
- Implementation of the expert system designs
- Development of AAS data model and elucidation of human expertise for AAS.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	15.8			15.8
Budget	Salaries :	38.3			38.3
Source:RAC	Total :	54.1			54.1
	Man Years :	1.5			1.5
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : June 8, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Solid-supported Isolation and Derivatization - An Approach to Automation of Environmental Organic Analysis

PROJECT NO: 327G
START DATE: (m/yr): 04/87
RES. PRIORITY:

SHORT TITLE: Solid-Supported Isolation and Derivatization

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator and Affiliation: Dr. J.M. Rosenfeld, Dept. of Chemistry, McMaster University

LIAISON OFFICER: (name, location, phone no.) D. Hall - Laboratory Services Branch 235-5910

INTERNAL PROJECTS
Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): The development of a technique utilizing a XAD-2 resin for an adsorbent as well as a support for analytical derivatization of organic compounds.

PROJECT DESCRIPTION: These objectives will be met through a systematic study of the variables to the reaction on the scale required for environmental analysis. They will be part of on-going studies on the chemistry of solid supported reactions on XAD-2 and other non-ionic macroreticular resins and application of this class of new reagents to analytical problems. The major focus of application will be the eventual development of robotics as a flexible analytical tool capable of addressing a majority of analytical requirements.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	10.0	10.5		20.5
	Salaries :	25.0	27.5		52.5
Budget	Total :	35.0	38.0		73.0
Source:RAC	Man Years :	1.1	1.1		2.2
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : June 9, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Detection and Quantification of Herbicides in Soil, Water and Plant Extracts Using an Enzyme-Linked Immunosorbent ASSAY (ELISA)

PROJECT NO: 328G
START DATE: (m/yr): 01/87
RES. PRIORITY:

SHORT TITLE: Detection of Herbicides

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. J.C. Hall, Environmental Biology University of Guelph
LIAISON OFFICER: (name, location, phone no.)	P. Crozier - Laboratory Services Branch 235-5911

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): The Development of an enzyme linked immunosorbent assay (ELISA) for the detection of trace levels of herbicides in soil, water and plants.

PROJECT DESCRIPTION: Detection of pesticides has been based mainly on conventional techniques such as gas-liquid chromatograph, HPLC, and thin-layer chromatography. Although these techniques are sensitive and reproducible, they are tedious, time consuming, and extremely expensive. In fields of clinical chemistry and endocrinology, immunochemistry is often the analytical method of choice because of its sensitivity, specificity, speed of analysis, ease of automation, cost effectiveness, and general applicability. The ELISA technique is a promising alternative because it shares many of the advantages of the radioimmunoassay, and it has the additional advantage of requiring only inexpensive equipment and of being well adapted to automated or partially automated methods.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating	13.0	5.0		18.0
	Salaries :	24.0	24.0		48.0
Budget	Total :	37.0	29.0		66.0
Source:RAC	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract	Solicited	Date : June 9, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Refinement and Testing of a Preconcentration Sampler for Dioxins in Water

PROJECT NO: 329G
START DATE: (m/yr): 04/87
RES. PRIORITY:

SHORT TITLE: Dioxins in Water

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Dr. Bryan R. Hollebone, Dept. of Chemistry
Carleton Univeristy

LIAISON OFFICER: (name, location, phone no.) H. Tosine - Laboratory Services Branch
235-5906

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To develop an automated preconcentration water sampler for the analysis of raw/treated water for chlorinated dioxins and dibenzofurans, and to deliver to MOE a final, tested prototype suitable for field work.

PROJECT DESCRIPTION: This is a one year project to complement design and operation modifications identified in the completed initial trials. Specifically:

1) Capacity and convenience of operation of filter systems will be improved;
2) Duplication of adsorption streams will be implemented with improved adsorption column designs; and,
3) Surrogate spike chemicals will be tested with improved spiking apparatus.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	15.0			15.0
	Salaries :	45.0			45.0
Budget	Total :	60.0			60.0
Source:RAC	Man Years :	1.5			1.5
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract	Solicited	Date : June 9, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: The Mobility and Persistence of Selected Organic Solute in Anaerobic Groundwaters and Possible In Situ Remediation Measures

PROJECT NO: 330G
START DATE: (m/yr): 04/87
RES. PRIORITY:

SHORT TITLE: Organic Solute in Anaerobic Groundwater

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Drs. J.F. Barker and J.A. Cherry, Institute for Groundwater Research, University of Waterloo

LIAISON OFFICER: (name, location, phone no.) M. Goodwin - Waste Management Branch
323-5217

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. To define the fate and persistence of selected organic solutes in anaerobic groundwater.
2. To evaluate remediation.
3. To establish a field test site.

PROJECT DESCRIPTION: A segment of an anaerobic, shallow aquifer will be instrumented and a series of natural-gradient injection experiments will be conducted to evaluate the natural fate and persistence of selected organic transformation of these organics in-situ under the anaerobic field conditions and the methods will be evaluated by natural-gradient injection experiments where the remedial additions are included in the injection.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating	62.1	62.0	61.6	185.7
	Salaries :	60.4	66.4	66.4	193.2
Budget Source:RAC	Total :	122.5	128.4	128.0	378.9
	Man Years :	3.4	3.8	3.8	11.0
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : May 25, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: In Situ Assessment of Mixed Copper and Zinc Impacts on White Sucker (Catastomus commersoni) Populations in Several Northern Ontario Lakes: an Evaluation of the Environmental Health Health Assessment to Validating Water Quality Criteria

PROJECT NO: 193G & 331G
START DATE: (m/yr): 04/85
RES. PRIORITY:

SHORT TITLE: Mixed Copper & Zinc Impacts

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: D. George Dixon
University of Waterloo

LIAISON OFFICER: (name, location, phone no.) C. Neville - Water Resources Branch
235-5799

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): This study represents an integrated field - laboratory program designed to determine the impacts of metal contamination on the white sucker populations of several lakes in the Manitouwadge district of Ontario. Metal effects will be assessed predominantly in terms of reproductive capacity, and survival of larval fish. The program will fulfill the stated research needs of the Ministry: 1) the development of in-situ and ecosystem indicators of water quality impairment, and 2) validation of a water quality criteria - objective approach to limiting the detrimental effects of aquatic contaminants. 3)To determine the impacts on Manitouwadge lakes. 4) To fully evaluate difference in growth, larval survival and larval resistance to metals as well as provide information on additional lakes.

PROJECT DESCRIPTION: This study will follow seasonal changes in gonad development, serum steroid levels and gamete viability in white suckers sampled from lakes, in the Manitouwadge chain, representing low, moderate and elevated levels of copper and zinc contamination. The fish will also be examine for histopathological evidence of a reaction to the elevated metal levels. During the second phase of the project, fertilized gametes from representative lakes will be returned to the University of Waterloo and examined for abnormalities in development and/or growth. Simultaneous toxicity tests will determine the possibility of genetic input to altered relative metal tolerance.

In order to validate assessment models it is necessary to isolate and identify factors associated with the altered health of the white sucker populations. More information is required on the nutritional and energy status of the fish, maternal factors associated with increased metal tolerance and effects of cross-fertilizations between lakes. This additional information will provide the strongest database for future comparisons of additional studies on ecosystem health in degraded environments.

BUDGET AND RESOURCES:	Year: (* current)	1	2	3 *	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	22.8	15.9	15.3	54.0
	Salaries :	16.0	16.0	22.9	54.9
Budget	Total :	38.8	31.9	38.2	108.9
Source:RAC	Man Years :	1.5	1.5	1.8	4.8
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports): Annual and semi-annual reports, 1 paper presented at MOE's Tech. Trans. Conf., 4 papers prepared for sending to journals

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: Approved for third year extension to 193RR.

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : May 25, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Development of an Expert System for Decision Making with Regard to Water Quality in Ontario Rivers

PROJECT NO: 250G & 332G
START DATE: (m/yr): 05/86
RES. PRIORITY:

SHORT TITLE: System for Water Quality

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator and Affiliation: Dr. T.E. Unny, Department of Systems Design University of Waterloo

LIAISON OFFICER: (name, location, phone no.) Dr. L. Logan - Water Resources Branch 323-4984

INTERNAL PROJECTS
Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To develop an expert system for applications in decision making with regard to water quality in Ontario Rivers with the objective to;

1. provide a basis for the assessment of uncertainties in water quality parameters;
2. develop a procedure to determine the effect of random variations in these parameters in decision making; and,
3. fill in the knowledge base of parameter specific toxicity and test the protoype system and modify the program.

PROJECT DESCRIPTION: MOE manages Water Quality Monitoring at strategic locations in Ontario rivers with the objective to assess the effect on water quality, the impact of waste water discharges from municipal and industrial plants and of diffuse sources of wastes from agricultural and other land uses.

Readings on water quality are taken at frequent intervals (generally at the rate of one reading a month) on 65 tributaries. The readings include hydrological parameters (streamflow), physical parameters (temperature, turbidity, etc.) and nutrient parameters.

BUDGET AND RESOURCES:	Year: (* current)	1	2	3 *	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	7.5	7.5	7.5	22.5
	Salaries :	20.0	20.0	20.0	60.0
Budget	Total :	27.5	27.5	27.5	82.5
Source:RAC	Man Years :	1.0	1.0		2.0
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports): Interim report, 1986; Paper presented at AGU Conference, 1987.

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: Approved for third year extension to 250RR.

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : June 9, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Slow Rate Infiltration Land Treatment and Recirculation of Landfill Leachate in Ontario

PROJECT NO: 333G
START DATE: (m/yr): 04/87
RES. PRIORITY:

SHORT TITLE: Recirculation of Leachates

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. R.A. McBride, Land Resource Science University of Guelph
LIAISON OFFICER: (name, location, phone no.)	A. Oda - Waste Management Branch 323-5129

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. To evaluate slow rate infiltration land treatment of leachate in forest/agricultural areas.
2. To evaluate recirculation of leachate as partial treatment.

PROJECT DESCRIPTION: This is a three year research study which will achieve the above objectives through the establishment of pilot-scale installations and the implementation of perturbation experiments at four sites across Ontario. Intensive characterization and monitoring of the more important biotic and abiotic ecosystem components will be carried out. Landfill recirculation will also be investigated as a means of pretreatment prior to slow rate infiltration land application, by lessening both leachate volume and strength.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	72.2	56.8	37.4	166.4
	Salaries :	99.0	91.0	91.0	281.0
Budget	Total :	171.2	147.8	128.4	447.4
Source:RAC	Man Years :	6.0	6.0	6.0	18.0
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract	Solicited	Date : June 9, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Behaviour, Detection and Control of Hazardous Immiscible Liquid Movement in Soil

PROJECT NO: 334G
START DATE: (m/yr): 04/87
RES. PRIORITY:

SHORT TITLE: Immiscible Liquid Movement in Soil

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Drs. G.J. Farqunar and E.A. McBean, Dept. of Civil Engineering, University of Waterloo

LIAISON OFFICER: (name, location, phone no.) L. Ficzere - Waste Management Branch
323-51 6

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To conduct laboratory scale experiments to study the movement, retention and control of hazardous immiscible liquids (HIL) in soil.

PROJECT DESCRIPTION: Experiments will involve the addition of different HIL to soil under various ranges of loading conditions in both 1-D vertical columns and 2-D flow cells on a laboratory scale. Measurements will be made to detect and to quantify the rate of movement and the retention in the soil as the HIL displace soil water both saturated and unsaturated conditions. Previously-developed, innovative methods for detecting HIL and for quantifying relative permeability and capillary pressure in variably-saturated conditions, will be used. Experiments will be carried out to extend the use of the thermal conductivity (TC) detection probe for large scale, field use. The thermistor, the power supply, the pulse time, the connections and the telethermometer will be redesigned and tested to modify the probe from its successful laboratory configuration to a field scale. A series of experiments will be done to test the effectiveness of groundwater pumping, solvent addition and air stripping in the removal of HIL from soil. Similar tests involving gas extraction and air injection will be done to assess the efficiency of these methods to control hazardous vapours in soil.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	22.2			
	Salaries :	34.2			
Budget Source	Total :	56.4	56.4	56.4	169.2
	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: Extension of 104PL

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract X	Solicited	Date : June 9, 1987
INTERNAL	Grant	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Development of the Backfill and Construction Application Guidelines - Phase II

PROJECT NO: 336C
START DATE: (m/yr): 04/87
RES. PRIORITY:

SHORT TITLE: Backfill and Construction Application

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: G. Zukovs - Division Manager
CANVIRO Consultants Ltd.

LIAISON OFFICER: (name, location, phone no.) R. Dalrymple - Waste Management Branch
323-5211

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To identify Ontario sites where industrial waste has been/is being used as backfill, to carry out a comprehensive study of the impact; to assess changes with time; to prepare draft guidelines.

PROJECT DESCRIPTION: Phase II work will primarily involve detailed bulk quality characterization and leachate testing of backfill material from selected sites, as well as site hydrogeologic investigations and the uses of these data in the criteria assessment exercise. In addition, changes to the Phase I work as per previous discussions will also be included in the Phase II work.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	98.7			98.7
	Salaries :	96.3			96.3
Budget	Total :	195.0			195.0
Source:RAC	Man Years :				
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract X	Solicited	Date : June 9, 1987
INTERNAL	Grant	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Control of Nuisance Blue-Green Algal Blooms in Eutrophic Waters Via Enhancement of Aerobic Microbial Respiration

PROJECT NO: 337C
START DATE: (m/yr): 06/87
RES. PRIORITY:

SHORT TITLE: Control of Blue-Green Algal Blooms

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Lewis Molot Molot Environmental Services
LIAISON OFFICER: (name, location, phone no.)	K. Nicholls - Water Resources Branch 235-5810

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To enhance the recreational value of eutrophic (nutrient-rich) waters by preventing dominance of phytoplankton communities by nuisance blue-green algae. The proposed remedy is enhancement of aerobic microbial repiration via optimization of aeration strategy.

PROJECT DESCRIPTION: Laboratory studies of algal growth and competition are proposed using two species isolated from Heart Lake - Microcystis sp., which was the dominant blue-green alga in 1986, and a eucaryotic alga dominant in May or June of 1987. The effects of a range of P and CO_2 on growth and cellular transport of CO_2, HCO_3^- and P will be investigated first in single species, continuous culture.
Parameters such as growth rate, intracellular phosphorus content, yield and transport affinities for P, CO_2 and HCO_3^- (Miller et al. 1984) will be measured. It is hoped that a relationship will help define the mechanism by which P and CO_2 affects the outcome of competition between algae.

BUDGET AND RESOURCES:	Year: (* current)	1*	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :	27.4			27.4
Source: RAC	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X	Contract	Solicited	Date : June 9, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Sulphur and Oxygen Isotope Composition in Aqueous Sulphate in a Dorset Watershed and their Role in Acid Rain Sulphur Cycle

PROJECT NO: 338G
START DATE: (m/yr): 05/87
RES. PRIORITY:

SHORT TITLE: Sulphur & Oxygen Isotope Composition

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Dr. Peter Fritz, Department of Earth Sciences University of Waterloo

LIAISON OFFICER: (name, location, phone no.) Dr. P. Dillon - Water Resources Branch (Dorset) (705) 766-2412

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To gain a better understanding of the fate and biochemical history of sulfate between fallout and runoff in a terrestrial watershed. Specifically, to assess the chemical processes affecting the isotopic composition of the soil sulphur compounds.

PROJECT DESCRIPTION: The ongoing project involves detailed monitoring of the sulphur and oxygen isotopic composition of sulphur compounds in soils and other interacting reservoirs. The investigators are sampling precipitation, throughfall, stemflow, spring, stream, bog and lake waters, in addition to soils and soil waters. The investigators will continue the study, focusing on the chemical processes affecting the isotopic composition of the soil sulphur compounds.

BUDGET AND RESOURCES:	Year: (* current)	1	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	13.5			13.5
	Salaries :	19.0			19.0
Budget	Total :	32.5			32.5
Source:RAC	Man Years :	1.2			1.2
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: Continuation (year 2) of project 228

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X Contract X Solicited
INTERNAL Grant Unsolicited X

Date : June 9, 1987
Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Technology Review of Biological Treatment of Trace Level Toxicants in Landfill Leachates

PROJECT NO: 339C
START DATE: (m/yr): 04/87
RES. PRIORITY:

SHORT TITLE: Toxicants in Landfill Leachates

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	Dr. J. Fein and Dr. Peter Fu Diversified Research Laboratories Limited
LIAISON OFFICER: (name, location, phone no.)	R. Khettry - Water Resources Branch 323-5226

INTERNAL PROJECTS
Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To evaluate the current status of biological treatment technologies applied to toxic industrial leachates - literature review and interviews.

PROJECT DESCRIPTION: An indepth report will be prepared, based on:
1. Comprehensive literature search using standard reference materials and on-line data bases;
2. Interviews with experts in field; and
3. Discussions with appropriate regulatory agencies in Canada and the U.S.A..

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	6.8			6.8
	Salaries :	25.0			25.0
Budget Source:RAC	Total :	31.8			31.8
	Man Years :	0.2			0.2
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X Contract X Solicited Date : June 9, 1987
INTERNAL Grant Unsolicited X Revision: August 28, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: The Development of a Procedure to Evaluate the Erosion of Landfill Covers

PROJECT NO: 340C
START DATE: (m/yr): 07/87
RES. PRIORITY:

SHORT TITLE: Erosion of Landfill Covers

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation:	D.R. Green, Water Resources Engineer Ecologistics Limited
LIAISON OFFICER: (name, location, phone no.)	G. Hughes - Waste Management Branch 323-5216

INTERNAL PROJECTS

Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. To evaluate the effect of climatic and environmental factors on the stability of landfill covers with respect to erosion.
2. To evaluate the performance of lysimeters installed in a landfill for use as tools in the study of landfill cover infiltration.
3. Research and evaluate current landfill cover design.

PROJECT DESCRIPTION: 1. Develop a preliminary micro computer model as a basic tool for the design of soil covers for landfills.

2. Monitor six preliminary lysimeters for the exploration of experimental techniques regarding leaching through soil covers.

3. Develop and undertake a set of field experiments to validate and finalize the model.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :	75.0			75.0
Source:RAC	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X Contract X Solicited X
INTERNAL Grant Unsolicited

Date : June 9, 1987
Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Study of the Discharge of Grey Water from Pleasure Boats

PROJECT NO: 341C
START DATE: (m/yr): 06/87
RES. PRIORITY:

SHORT TITLE: Grey Water From Pleasure Boats

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Beak Consultants Ltd.

LIAISON OFFICER: (name, location, phone no.) D.J. Birnbaum - Environmental Approvals & Land Use Planning Branch, 323-4502

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S):1)To determine the amount of 'grey water' and "black water" produced by three types of pleasure boats in Ontario.

2)To determine the bacterial characteristics of grey water in Ontario pleasure boats, specifically with regard to E. Coli, fecal Coliform, Pseudomonas Aeruginosa and Staphylococcus Aureus with regard to three types of pleasure boats.

3)To evaluate the effects on the receiving recreational waters of the discharge of this grey water.

4)Should it be decided, as a result of this study and other factors, that grey water must be retained on board for later disposal, to estimate whether the capacity of existing pumpout facilities in Ontario is adequate.

PROJECT DESCRIPTION:-Determination of quantity of both grey and black water produced on board selected boats.

-Bacterial analysis of grey water obtained on board, and of receiving water in areas where pleasure boats discharge grey water.

-Analysis and evaluation of these findings for their environmental significance.

-A survey of the capacity of pumpout facilities in five selected areas of the province, and estimate of the capacity of existing pumpout facilities to accept an enhanced amount of sewage.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	51.4			51.4
Budget Source:RAC	Salaries :	36.3			36.3
	Total :	87.7			87.7
	Man Years :	0.6			0.6
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
Budget Source:	Salaries :				
	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.).

EXTERNAL X Contract Solicited **Date : June 9, 1987**
INTERNAL Grant X Unsolicited X **Revision: October 6, 1987**

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Plant Bioassays for the Detection of Environmental Mutagens in an Aquatic Environment

PROJECT NO: 342G
START DATE: (m/yr): 06/87
RES. PRIORITY:

SHORT TITLE: Plant Bioassay

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS

Principal Investigator and Affiliation: Dr. W.F. Grant, Department of Biology
York University

LIAISON OFFICER: (name, location, phone no.) Dr. M. Salamone - Water Resources Branch
235-5790

INTERNAL PROJECTS

Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To develop bioassays with higher plant systems which will address the impact of industrial effluents on the aquatic environment.
To use short term higher plant bioassays for the detection of environmental mutagens and to make recommendations on the genetic nature (mutagenicity) of effluents and selected compounds.

PROJECT DESCRIPTION: Three higher plant short-term mutagenicity assays will be used. The assay systems will include a) The Tradescantia Stamen Hair Assay for the detection of mutations, b) The Tradescantia Micronucleus Assay for the Detection of chromosome aberrations and, c) The Arabidopsis Embryo Mutation Assay for the detection of chlorophyll mutations in the embryo. These assays will be used to develop bioassays with higher plant systems which will address the impact of industrial effluents on the aquatic environment. The development of a facility with an artificial substrate will allow for the imbibition or diffusion of a liquid through the substrate to be taken up by higher plants for the monitoring of the aquatic effluents. In addition, these assays will be applied to effluents and other compounds selected by the Ministry. The assay systems developed for detecting mutagenicity of industrial effluent on plants will be evaluated as well as selected compounds.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	19.3	17.4		36.7
	Salaries :	53.2	59.1		112.3
Budget	Total :	72.5	76.5		149.0
Source:RAC	Man Years :				
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

AIR RESOURCES BRANCH PROJECTS

PROJECT NO.	TITLE	PAGE
ARB87-01	Fluoride Criteria Studies	168
ARB87-02	Toxics Deposition Sampler Development	169
ARB87-03	Inhalable Particulate Sampling at Several Ontario Sites	170
ARB87-04	Augmentation of List of Toxic Chemicals	171

EXTERNAL	Contract	Solicited	Date : April 30, 1987
INTERNAL X	Grant	Unsolicited	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Fluoride Criteria Studies

PROJECT NO: ARB87-01
START DATE: (m/yr): 11/85
RES. PRIORITY:

SHORT TITLE: Fluoride Criteria

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator
and Affiliation:

LIAISON OFFICER:
(name, location, phone no.)

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

Mr. R. D. Jones (456-2504)
Phytotoxicology Section
Controlled Environment Library
Brampton

SUPERVISOR: D. S. Harper

OBJECTIVE(S): To conduct a series of controlled environment exposures to evaluate the current (proposed) 24 hour gaseous fluoride criteria in air, with respect to injury to vegetation.

PROJECT DESCRIPTION: Various species of plants with known sensitivity to gaseous fluoride are being exposed to fluoride concentrations at and above 1ppb (v/v) (0.86ug/l) for 24 hours. Injuries resulting from these exposures are rated and the plant tissue evaluated including: Manitoba maple, plum, gladiolus, apricot, tulip, wild grape and white pine. On completion, the validity of the 24 hour criterion (1ppb) will be assessed.

BUDGET AND RESOURCES:	Year: (* current)	1	2 *	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				
INTERNAL	Cost: (000's)				
PROJECTS	Operating:	4.0	4.0	10.0	18.0
	Salaries :	18.0	18.0	26.0	62.0
Budget	Total :	22.0	22.0	36.0	98.0
Source:	Man Years :	0.5	0.5	0.75	1.75

OUTPUT (papers, presentations, reports): The results will be published in a Ministry report and possibly in a refereed Journal.

EXTERNAL PARTICIPATION (ministries, governments, agencies):
None

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL Contract Solicited Date : April 10, 1987
INTERNAL X Grant Unsolicited Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Toxics Deposition Sampler Development
PROJECT NO: ARB87-02
START DATE: (m/yr): 1983
RES. PRIORITY:

SHORT TITLE: Toxics Sampler
MBR PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator and Affiliation:

LIAISON OFFICER:
(name, location, phone no.)

INTERNAL PROJECTS
Principal Investigator: (name, location, phone no.)
Dr. M. Lusis (965-1634)
MOE Air Ressources Branch
880 Bay Street
Toronto

SUPERVISOR: L. Shenfeld

OBJECTIVE(S): To develop samplers with which the wet and dry deposition of PCBs, PAHs, various pesticides and dioxins/furans can be determined.

PROJECT DESCRIPTION: Air and precipitation samplers for PCBs, PAHs, various pesticides, and dioxins and furans, as well as laboratory analysis methods for the resulting samples are being developed. The sampling and analytical methodologies are to be used for the the long-term monitoring of atmospheric deposition to the Great Lakes Basin.

BUDGET AND RESOURCES:	Year: (* current)	1	2	3 *	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:	100.0	100.0	100.0	300.0
	Salaries :	30.0	30.0	30.0	90.0
Budget	Total :	130.0	130.0	130.0	390.0
Source:	Man Years :	1.0	1.0	1.0	3.0

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):
U.S. EPA, University of Minnesota, Canada Centre for Inland Waters.

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL Contract Solicited Date : May 1, 1987
INTERNAL X Grant Unsolicited Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Inhalable Particulate Sampling at Several Ontario Sites

PROJECT NO: ARB87-03
START DATE: (m/yr):
RES. PRIORITY:

SHORT TITLE: Inhalable Particulate Sampling

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator
and Affiliation:

LIAISON OFFICER:
(name, location, phone no.)

INTERNAL PROJECTS
Principal Investigator: P. Steer (965-4081)
(name, location, phone no.) MOE Air Resources Branch
880 Bay Steet, 4th floor
SUPERVISOR: Dr. W. Chan

OBJECTIVE(S): 1) Evaluate the precision and accuracy of particulate samplers
2) Collect defensible inhalable particulate data at several Ontario sites to lead to the setting of a provincial standard for IP.

PROJECT DESCRIPTION: IP data are collected using dichotomous samplers, the exposed filters are analyzed by XRF and the results entered into the SIS. The data base is then accessible by micro-computer to run analyses for precision and accuracy, sampler intercomparison and chemical mass-balance to determine point sources of pollution.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				
INTERNAL	Cost: (000's)				
PROJECTS	Operating:	30.0			30.0
	Salaries :				
Budget	Total :	30.0			30.0
Source:	Man Years :	0.7			0.7

OUTPUT (papers, presentations, reports): None as yet - methodology, instrumentation, etc. is still at the development stage.

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract X	Solicited X	Date : April 13, 1987
INTERNAL	Grant	Unsolicited	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Augmentation of List of Toxic Chemicals

PROJECT NO: ARB87-04
START DATE: (m/yr): 03/87
RES. PRIORITY:

SHORT TITLE: Toxic Chemical Update

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS Principal Investigator and Affiliation:	Dale Rooney Concord Scientific
LIAISON OFFICER: (name, location, phone no.)	Dr. Gerald Diamond (965-4081) MOE Air Resources Branch - 880 Bay St., 4th fl.

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To update chemical list for toxic gas release emergency program and to augment search routines.

PROJECT DESCRIPTION: To update and select new chemicals for use in an emergency response program. Chemicals chosen are to be a) toxic and gaseous and b) likely to be used or transported in Ontario in sufficient quantities to cause a hazard. To update current related toxicological parameters.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :	23.2			23.2
Source:	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports): Reports; updated 5 1/4 inch IBM compatable diskette with updated program.

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

WATER RESOURCES BRANCH PROJECTS

PROJECT NO.	TITLE	PAGE
WRB87-01	Stripping of Volatile Organics During Sewage Treatment - At Full Scale STP's	173
WRB87-02	Stripping of Volatile Organic Contaminants - Pilot Scale Study	174
WRB87-03	In-Situ UV Disinfections of Bathing Beach Water	175
WRB87-04	Colborne WPCP Nitrification - De-Nitrification Process Study	176
WRB87-05	Model Development - Food Chain Component	177
WRB87-06	Volatiles in Ambient Water - Low Level Detection	178
WRB87-07	Toxicity of Mixtures of Organic Chemicals	179
WRB87-08	Monitoring of Toxics Contaminants in 40 STP's	180
WRB87-09	Literature Review - Acute Toxicity in Municipal Sewage Effluent	181
WRB87-10	Management Strategy for Total Phosphorus in Municipal STP Effluent	182
WRB87-11	Huntsville Basin Contaminant Assessment Project	183
WRB87-12	Muskoka Lakes Monitoring Program (Inland Lakes)	184
WRB87-13	Lake of the Woods Assessment (Inland Lakes)	185
WRB87-14	Sturgeon - Rice Lakes Nutrient Budget Study (Inland Lakes)	186
WRB87-15	Methods for Locating and Estimating Solute Loadings Through Groundwater Entering the St. Mary's River	187

EXTERNAL X	Contract X	Solicited	Date : July 31, 1987
INTERNAL	Grant	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Stripping of Volatile Organics During Sewage Treatment - at Full Scale STP's

PROJECT NO: WRB87-01
START DATE: (m/yr): 04/87
RES. PRIORITY:

SHORT TITLE: Air Stripping

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator and Affiliation: Dr. Henryk Melcer (323-4980)
Environment Canada
Wastewater Technology Center

LIAISON OFFICER:
(name, location, phone no.) Tony Ho (323-4980)
1 St. Clair Ave. West, 12th fl.

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To investigate the significance of air stripping as a means of removing volatile organics during sewage treatment.

PROJECT DESCRIPTION: Composite samples of liquid sewage and off-gas were collected at the aerated grit chamber and aeration tanks (for biological treatment). Samples were analysed for the presence of volatile organics. This study was carried out at four full-scale STPs in conjunction with the 40 STPs study.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)	210.0			210.0
	Operating:				
	Salaries :				
Budget Source:WRB	Total :	210.0			210.0
	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract X	Solicited	Date : July 31, 1987
INTERNAL	Grant	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Stripping of Volatile Organic Contaminants - Pilot Scale Study

PROJECT NO: WRB87-02
START DATE: (m/yr): 09/87
RES. PRIORITY:

SHORT TITLE: Air Stripping Model

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS Principal Investigator and Affiliation:	Dr. Henryk Melcer Environment Canada Wastewater Technology Center
LIAISON OFFICER: (name, location, phone no.)	Tony Ho (323-4980) 1 St. Clair Ave. West, 7th fl.

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1) To determine the operational factors affecting the stripping of volatile organics during sewage treatment.
2) Optimize treatment process to minimize the stripping of volatile organics.

PROJECT DESCRIPTION: The effect of process design and operation on the stripping of volatile organics will be evaluated at a pilot scale plant. A mathematical model to describe the stripping phenomena will be developed/ verified. Parallel studies will then be carried out at pilot and full-scale plants to address 'scale up' effects.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)	165.0			165.0
PROJECTS	Operating:				
	Salaries :				
Budget	Total :	165.0			165.0
Source:WRB	Man Years :				
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract	Solicited	Date : July 31, 1987
INTERNAL	Grant X	Unsolicited X	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: In-situ UV disinfections of Bathing Beach Water

NO: WRB87-03
START DATE: (m/yr): 01/86
RES. PRIORITY:

SHORT TITLE: UV Disinfection

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator and Affiliation: D. Pearson
Upper Thames Conservation Authority

LIAISON OFFICER: (name, location, phone no.) T. Ho (323-4980)
1 St. Clair Ave. West, 7th fl.

INTERNAL PROJECTS
Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To investigate the feasibility and design/operating requirements to improve bathing beach bacterial water quality through the use of recirculation and in-situ UV disinfection process.

PROJECT DESCRIPTION: A full scale containment, recirculation, and UV disinfection process was constructed and evaluated at the Fenshaw Park Beach, in London Ontario.

BUDGET AND RESOURCES:	Year: (* current)	1	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)	20.0	200.0	80.0	300.0
	Operating:				
	Salaries :				
Budget Source:WRB	Total :	20.0	200.0	80.0	300.0
	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget Source:	Total :				
	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X	Contract X	Solicited X	Date : July 30, 1987
INTERNAL	Grant	Unsolicited	Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Colborne WPCP Nitrification - De-Nitrification Process Study

PROJECT NO: WRB87-04
START DATE: (m/yr): 01/86
RES. PRIORITY:

SHORT TITLE: Nitrification Study

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS **Principal Investigator and Affiliation:**	Mrs. Jean Herskowitz Scientist Village of Colborne
LIAISON OFFICER: **(name, location, phone no.)**	W. Lewanadowski (323-4984) MOE - Water Resources Branch

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): Development of a low cost Nitrification - De-Nitrification Sewage treatment process.

PROJECT DESCRIPTION: Conduct research to explore process. Data will be used to analyse the the operational conditions and design for optimal system performance. The final report will provide process design guidelines.

BUDGET AND RESOURCES:	Year: (* current)	1	2 *	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:	3.0	3.0		6.0
	Salaries :	38.0	19.0		57.0
Budget	Total :	41.0	22.0		63.0
Source:	Man Years :	1.0	0.5		1.5
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports): Low Cost Nitrification - De-Nitrification System for the Control of Ammonia and Hydrogen Sulphide in Waste Stabilization Pond Effluents - Report

EXTERNAL PARTICIPATION (ministries, governments, agencies):
Village of Colborne

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X Contract X Solicited X
INTERNAL X Grant Unsolicited

Date : Sept. 3 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Model Development - Food Chain Component

PROJECT NO: WRB87-05
START DATE: (m/yr):
RES. PRIORITY:

SHORT TITLE: Food Chain Model

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS Principal Investigator and Affiliation:	Dr. J. A. McCorgyodale University of Windsor
LIAISON OFFICER: (name, location, phone no.)	Yousry Hamdy (323-4962) MOE - Water Resources Branch - Great Lakes Section
INTERNAL PROJECTS Principal Investigator: (name, location, phone no.)	P. Nettleton (323-4964) MOE - Water Resources Branch - Great Lakes Section
SUPERVISOR:	Yousry Hamdy

OBJECTIVE(S): To enhance the existing Food - Chain Sub - Model for incorporation into the 'WASTOX' Contaminant Fate Model

PROJECT DESCRIPTION: Studies conducted on two MISA pilot - sites (St. Mary's and St. Clair Rivers) have collected extensive ecosystem data. In the past, this data has been incorporated into a single 'BIOTA' compartment. Development of this sub-model will provide a more realistic and accurate representation of the ecosystem. This will enable specific data needs to be identified as well as strengthen the fate and transport model.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:	80.0			80.0
	Salaries :	15.0			15.0
Budget	Total :	95.0			95.0
Source:WRB	Man Years :	0.4			0.4

OUTPUT (papers, presentations, reports):
Model Simulation Reports and Scientific Papers.

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X Contract X Solicited X Date : Sept. 3 1987
INTERNAL X Grant Unsolicited Revision: October 16, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Volatiles in Ambient Water - Low Level Detection.
NO: WRB87-06
START DATE: (m/yr):
RES. PRIORITY:

SHORT TITLE: Volatiles Detection
MBR PROJECT CATEGORY:

EXTERNAL PROJECTS Principal Investigator and Affiliation:	Mann Testing
LIAISON OFFICER: (name, location, phone no.)	Dr. Bill Berg (235-5907) MOE - Lab Services Branch, Drinking Water Organics Section
INTERNAL PROJECTS Principal Investigator: (name, location, phone no.)	Dr. Bill Berg
SUPERVISOR:	Ms. Helle Tosine - Manager DWO (235-5906)

OBJECTIVE(S): To develop appropriate methods for non-routine low level (<100 ppt) detection of volatile contaminants in surface water. To enable model calibration for contaminant transport.

PROJECT DESCRIPTION: Aquisition of a dedicated GC to enable detection of volatile contaminants at levels below the present 1 ug/l method with subsequent transfer of technology to the Ministry. Quantitative values are not presently available to adequately calibrate fate and transport models. This will provide actual observed values and improve confidence.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:LSB	Man Years :				
INTERNAL	Cost: (000's)				
PROJECTS	Operating:	80.0			80.0
	Salaries :				
Budget	Total :	80.0			80.0
Source:WSB	Man Years :	0.2			0.2

OUTPUT (papers, presentations, reports):
Validated method for low-level volatile detection.

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.) .

EXTERNAL X	Contract X	Solicited X	Date : July 28, 1987
INTERNAL	Grant	Unsolicited	Revision: October 16, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Toxicity of Mixtures of Organic Chemicals.

PROJECT NO: WRB87-07
START DATE: (m/yr): 04/85
RES. PRIORITY: ,

SHORT TITLE: Organic Toxicity

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS Principal Investigator and Affiliation:	Dr. George Ozburn Dept of Biology, Lakehead University Thunder Bay, Ontario
LIAISON OFFICER: (name, location, phone no.)	G. Westlake (Technical), J. Ralston (Admin). MOE - Water Resources Branch (235-5967)

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To assess the aquatic toxicity of industrial organic substances alone and as mixtures.

PROJECT DESCRIPTION: Acute and chronic toxicity testing using flagfish and trout for the assessment of chloroethanes and chloroethylenes - toxicity of single isomers or mixtures of two or more substances. -assessment of the bioaccumulation of these substances.

BUDGET AND RESOURCES:	Year: (* current)	1	2	3 *	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :	165.0	201.5	149.2	515.7
Source:	Man Years :	4.0	5.0	4.0	13.0
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports): Individual technical papers on each substance or mixture and a final comprehensive report.

EXTERNAL PARTICIPATION (ministries, governments, agencies): Steering committee with members from the U.S. EPA and Environment Canada

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COMMENTS: This project is an extension of previous RAC - funded research into the toxicity of chlorophenol and chlorobenzene.

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X   Contract X   Solicited X   Date : July 31, 1987
INTERNAL   Grant   Unsolicited   Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Monitoring of Toxics Contaminants in 40 STP's

PROJECT NO: WRB87-08
START DATE: (m/yr): 01/87
RES. PRIORITY:

SHORT TITLE: Toxic Monitoring

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator and Affiliation: G. Zukovs
Canviro Consultants Ltd.

LIAISON OFFICER: (name, location, phone no.) T. Ho (323-4980)
1 St. Clair Ave. West, 7th fl.

INTERNAL PROJECTS
Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To collect the necessary data for the development of MISA - municipal STP monitoring and compliance regulations.

PROJECT DESCRIPTION: Daily composite samples of raw sewage final effluent and sludges were collected at 40 municipal STP's in Ontario. The samples were analysed for the presence of 180 parameters including conventional contaminants, trace organics and heavy metals.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)	440.0	-	-	440.0
PROJECTS	Operating:				
	Salaries :				
Budget	Total :	440.0			440.0*
Source:WRB	Man Years :				
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at PCAO Conference, 1986

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: An additional 1,160K was spent on related sampling and analysis for trace organics.

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X   Contract X   Solicited X
INTERNAL   Grant   Unsolicited

Date : July 31, 1987
Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Literature Review - Acute Toxicity in Municipal Sewage Effluent

PROJECT NO: WRB87-09
START DATE: (m/yr):
RES. PRIORITY:

SHORT TITLE: Toxicity Review

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator and Affiliation: G. Craig
Beak Consultants Ltd.

LIAISON OFFICER: (name, location, phone no.) T. Ho (323-4980)
1 St. Clair Ave. West, 7th fl.

INTERNAL PROJECTS
Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1) To estimate the magnitude of acute toxicity problems in municipal STP effluent.
2) To determine the most prevalent chemical parameters causing acute toxicity to aquatic organisms.

PROJECT DESCRIPTION: Acute toxicity test data developed in the past in Ontario STP's were assembled to determine objectives 1 , U.S. EPA data are also being reviewed for toxicity caused by metals.

BUDGET AND RESOURCES:	Year: (* current)	1	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:WRB	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization

EXTERNAL X	Contract X	Solicited X	Date : July 31, 1987
INTERNAL	Grant	Unsolicited	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Management Strategy for Total Phosphorus in Municipal STP Effluent

PROJECT NO: WRB87-10
START DATE: (m/yr):
RES. PRIORITY:

SHORT TITLE: Phosphorus Strategy

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator and Affiliation: S. Nut
Canviro Consultants Ltd.

LIAISON OFFICER: (name, location, phone no.) J. Archer (323-4978)
1 St. Clair Ave. West, 7th fl.

INTERNAL PROJECTS
Principal Investigator: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S):
- To determine factors affecting TP removal
- To assist STP's to improve TP removal
- To determine best long-term abatement strategy for reducing TP loadings

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PROJECT DESCRIPTION:

BUDGET AND RESOURCES:	Year: (* current)	1	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				210.0
	Operating:				
	Salaries :				
Budget	Total :				210.0
Source:CofA	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				

OUTPUT (papers, presentations, reports):
Paper presented at Tech. Trans. Conf., 1985

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL	Contract	Solicited	Date : June 19, 1987
INTERNAL X	Grant	Unsolicited	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Huntsville Basin Contaminant Assessment Project

PROJECT NO: WRB87-11
START DATE: (m/yr): 04/86
RES. PRIORITY:

SHORT TITLE: Mercury in Lakes

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator and Affiliation:

LIAISON OFFICER:
(name, location, phone no.)

INTERNAL PROJECTS
Principal Investigator: (name, location, phone no.)
Bernie Neary/ Greg Mierle
Dorset Research Centre
705-766-2412

SUPERVISOR: Dr. P.J. Dillon

OBJECTIVE(S): 1) To determine the cause and extent of severe mercury contamination of fish populations in the lakes surrounding Huntsville.

2) To assess the geographical extent of contaminated fish populations, and to determine the relative concentration of mercury in streams feeding into contaminated lakes.

PROJECT DESCRIPTION: Stream sampling has begun on tributaries of contaminated (Vernon) and uncontaminated (Peninsula) lakes. MNR Algonquin region will be performing an enhanced sport fish collection on lakes in the area. MOE staff will be collecting periphyton from stream beds in May, and young perch from many of the same lakes as will be done for sport fish.

BUDGET AND RESOURCES:	Year: (* current)	1	2 *	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				
INTERNAL	Cost: (000's)				
PROJECTS	Operating:	160.0	100.0	150.0	410.0
	Salaries :	27.8	57.9	61.0	146.7
Budget	Total :	187.8	157.9	211.0	556.7
Source: WRB	Man Years :	0.6	1.4	1.4	3.4

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):
MOE Central Region, MNR Algonquin Region

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL	Contract	Solicited	Date : June 19, 1987
INTERNAL X	Grant	Unsolicited	Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Muskoka Lakes Monitoring Program (Inland Lakes)*

PROJECT NO: WRB87-12
START DATE: (m/yr): 06/86
RES. PRIORITY:

SHORT TITLE: Lakes Monitoring

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator
and Affiliation:

LIAISON OFFICER:
(name, location, phone no.)

INTERNAL PROJECTS Principal Investigator: (name, location, phone no.)	Bernie Neary Dorset Research Center 705-766-2412

SUPERVISOR: Dr. P. J. Dillon

OBJECTIVE(S): 1) To assess the degree of enrichment of L. Muskoka, Joseph, Rosseau and Lake of Bays, with emphasis on embayments.
2) To update the sensitivity assessment for Lake of Bays.

PROJECT DESCRIPTION: Ten to fifteen stations per lake, mostly situated in bays, will be sampled monthly. Samples will be taken from the epi-, meta- and hypolimnion for nutrients and major ions. In addition, euphotic zone plankton hauls will be done, and temperature and oxygen profiles will be constructed. Sampling on Gravenhurst Bay will be done bi-weekly, and will also have euphotic zone composite and a sample off bottom taken to permit comparison with data collected previously. The Lake of Bays filamentous algae work will include aerial photographic surveys, ground truthing and algae identification.

BUDGET AND RESOURCES:	Year: (* current)	1	2 *	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget	Total :				
Source:WRB	Man Years :				
INTERNAL	Cost: (000's)				
PROJECTS	Operating:	62.0	60.0	60.0	182.0
	Salaries :	21.6	10.6	10.6	42.8
Budget	Total :	83.6	70.6	70.6	224.8
Source:WRB	Man Years :	0.5	0.2	0.2	0.9

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):
MOE Central Region

COMMENTS: *Note: A complementary project is being conducted by the Aquatic Biology Section, Water Resources Branch.

NOTE: "External" refers to projects carried out by investigators outside the Ministry.
Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL Contract Solicited
INTERNAL X Grant Unsolicited

Date : June 19, 1987
Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Lake of the Woods Assessment (Inland Lakes)

PROJECT NO: WRB87-13
START DATE: (m/yr): 04/87
RES. PRIORITY:

SHORT TITLE: Algae Detection

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator and Affiliation:

LIAISON OFFICER:
(name, location, phone no.)

INTERNAL PROJECTS
Principal Investigator: (name, location, phone no.)
Bernie Neary
Dorset Research Centre
705-766-2412

SUPERVISOR: Dr. P. J. Dillon

OBJECTIVE(S): To assess the nutrient status of Lake of the Woods using remote sensing and ground truthing

PROJECT DESCRIPTION: The use of remote sensing techniques to determine whether or not there has been an actual increase in algal blooms in the northern part of Lake of the Woods is under consideration. A feasibility study will determine the applicability of this technique to the algal problem in Lake of the Woods.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:	34.9	60.0	100.0	194.9
	Salaries :	9.5	10.0	11.0	30.5
Budget	Total :	44.4	70.0	111.0	225.4
Source:WRB	Man Years :	0.2	0.2	0.2	0.6

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies)
MOE Northwestern Region, MNR Lake of the Woods Assessment Unit

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL Contract Solicited Date : June 19, 1987
INTERNAL X Grant Unsolicited Revision: October 6, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Sturgeon - Rice Lakes Nutrient Budget Study (Inland Lakes)*

PROJECT NO: WRB87-14
START DATE: (m/yr): 06/86
RES. PRIORITY:

SHORT TITLE: Nutrient Budget

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS
Principal Investigator
and Affiliation:

LIAISON OFFICER:
(name, location, phone no.)

INTERNAL PROJECTS
Principal Investigator: Bernie Neary
(name, location, phone no.) Dorset Research Centre
705-766-2412

SUPERVISOR: Dr. P. J. Dillon

OBJECTIVE(S): 1) To construct nutrient budgets for Rice and Sturgeon Lakes.
2) To estimate the impact of potential increases in nutrient loads from the Peterborough and Lindsay STP's on lake water quality and algae and macrophyte growth.

PROJECT DESCRIPTION: Major tributaries of both lakes will be sampled for water quality, and will have water quality measurements performed. Nutrient loads from the atmosphere will be determined from the existing ARB deposition network. In-lake sampling of water will provide estimates of in-lake cycling and nutrient variability. The response of algae and macrophyte communities will be assessed by dosing nutrients into lake enclosures.

BUDGET AND RESOURCES:	Year: (* current)	1	2 *	3	TOTAL
EXTERNAL PROJECTS	Cost: (000's)				
	Operating:				
	Salaries :				
Budget	Total :				
Source:	Man Years :				
INTERNAL PROJECTS	Cost: (000's)				
	Operating:	125.0	125.0	125.0	375.0
	Salaries :	50.6	53.5	55.0	159.1
Budget	Total :	175.6	178.5	180.0	534.1
Source: WRB	Man Years :	1.1	1.4	1.4	3.9

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):
MOE Central Region, Parks Canada, MNR

COMMENTS: *A complementary project is being conducted by the Aquatic Biology Section, Water Resources Branch.

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

EXTERNAL X Contract X Solicited
INTERNAL Grant Unsolicited X

Date : July 1, 1987
Revision: October 16, 1987

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Methods for Locating and Estimating Solute Loadings Through Groundwater Entering the St. Mary's River.

PROJECT NO: WRB87-15
START DATE: (m/yr): 06/87
RES. PRIORITY:

SHORT TITLE: Contaminated Groundwater

MBR PROJECT CATEGORY:

EXTERNAL PROJECTS Principal Investigator and Affiliation:	Mr. David Lee Atomic Energy of Canada Ltd. Research Company Chalk River Nuclear Laboratory Chalk River, Ontario, K0J 1J0
LIAISON OFFICER: (name, location, phone no.)	Wayne Wager Sarnia (519-336-4030)

INTERNAL PROJECTS
Principal Investigator:
(name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): Develop method for locating subsurface discharge of contaminated groundwater into rivers. If possible quantify subsurface contaminant loading to St. Mary's River.

PROJECT DESCRIPTION: Prototype sediment conductivity probes will be used both by dragging behind a boat and by divers to locate areas of sediments of above background conductivity and/or temperature differential; install piezometers; collect core samples for chemical analyses; install seepage meters.

BUDGET AND RESOURCES:	Year: (* current)	1 *	2	3	TOTAL
EXTERNAL	Cost: (000's)				
PROJECTS	Operating:	14.5			14.5
	Salaries :	35.0			35.0
Budget	Total :	49.5			49.5
Source:RAC	Man Years :	1.0			1.0
INTERNAL	Cost: (000's)				
PROJECTS	Operating:				
	Salaries :				
Budget IRSP	Total :				
Source:3006	Man Years :				

OUTPUT (papers, presentations, reports): Report as part of St. Mary's MISA pilot site; poster session at SETAC, paper at IAGLR.

EXTERNAL PARTICIPATION (ministries, governments, agencies): None

COMMENTS:

NOTE: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget source by organization (e.g. RAC, OPAC, WRB, NER etc.)

LABORATORY SERVICES BRANCH PROJECTS

PROJECT NO.	TITLE	PAGE
DWO-I-87-01	Investigation of the Use of the Aqueous Phase Liquid Extractor (APLE) for Ultra Trace Organic Sampling of Water for Determination of Chlorinated Dibenzo-p-dioxins /Furnans (CDD/CDF)	192
DWO-I-87-02	Comparison of Mass Spectral Instrumental Capabilities (Low Resolution Mass Spectrometer - LRMS, High Resolution MS-HRMS, Mass Spectrometer, Mass Spectrometer - MSMS) for Chlorinated Dibenzo-p-dioxin and Dibenzofuran Determination	193
DWO-E-87-03	Method Development for Aqueous Volatitle Halocarbons Analysis at the Parts Per Trillion Level	194
DWO-I-87-03	Stability Study of Chlorinated Dibenzo-p-dioxins and Dibenzofurans in Fish During Storage	195
DWO-E-87-04	Solid Phase Extraction (SPE) of Organochlorines from Liquid Samples	196
DWO-I-87-04	Automated Cleanup Method for Dioxins in Fish	197
DWO-E-87-05	Development of Gas Chromatograph/ Mass Spectrometer (GC/MS) Data Processing Capabilities	198
DWO-I-87-05	Method Development for the Determination of Chlorinated Dibenzo-p-dioxins and Dibenzofurans in Ambient Air	199
DWO-E-87-06	Development of Software for the Automated Interpretation of Gas Chromatography - Mass Spectrometry (GC-MS) Analysis of Chlorinated Dibenzo-p-dioxins and Dibenzofurans (CDD/CDF)	200
DWO-I-87-06	Investigation of Chlorinated Dibenzo-p-dioxins and Dibenzofurans in Atmospheric Deposition	201

PROJECT NO.	TITLE	PAGE
DWO-I-87-07	Investigation of Volatiles Loss/Degradation in Fish/Sediment During Storage	202
DWO-I-87-09	Development and Automation of a High Performance Liquid Chromatograph (HPLC) Method for the Analysis of PAH's in Drinking Water	203
DWO-I-87-10	Feasibility Study for the Analysis of Toxaphene in Drinking Waters	204
DWO-I-87-12	Identification of Unknown Organic Contaminants by High Resolution Mass Spectrometry (HRMS)	205
ITC-I-87-01	Tacer Studies Using ICP/MS Isotope Ratios: Air Particulate	206
ITC-E-87-02	ICP/MS Analytical Development	207
ITC-I-87-02	Determination of Arsenic, Selenium and Antimony in Environmental Matrices by Flow Injection Analyzer (FIA) - Hydride Flameless Atomic Absorption Spectrophotometric (FAAS) Techniques	208
ITC-I-87-03	The Application of Robotics for the Digestion of Fish Samples for Mercury Analysis	209
ITC-I-87-07	Microwave Digestion of Vegetation and Soil Samples	210
ITC-I-87-08	Application of Robotics to Digestion of Vegetation and Soil Samples for Analysis of Metals	211
ITC-I-87-11	ICP/MS Development of Method for Analysis of Drinking Water for Elements	212
ITC-I-87-12	Development of New Low Volume Sampling System Using Teflon Filters for Trace Metals Analysis of Air Samples by X-Ray Fluorescence Spectrometry	213
ITC-I-87-14	Development of Methods for the Determination of Electroactive Species such as CN-, S=, by Ion Chromatography	214

PROJECT NO.	TITLE	PAGE
TO-E-87-01	Super Critical Fluid Extraction and Development of Methodology	215
TO-I-87-01	Chemical Characterization by Fourier Transform Infrared Spectroscopy (FT-IR)	216
TO-I-87-02	Diffuse Reflectance Infrared Fourier Transform Spectroscopy (Drift)	217
TO-I-87-03	Introduction of Gas Chromatography Fourier Transform Infrared Spectroscopy (GC-FTIR) for Mixed Waste Analysis	218
TO-I-87-05	Evaluation of 'TOX' Analyser for On-Site Monitoring of Chlorinated Organics in Leachate	219
TO-I-87-06	Development and Evaluation of Micro Extraction/Clean-up Techniques for Mobile Lab Implementation	220
TO-I-87-07	Mass Selective Detector (MSD) for Mobile Laboratory Use	221
TO-I-87-08	Evaluation of Purge and Trap and Headspace Techniques for On-Site Analysis of Volatile Organics in Groundwater	222
TO-I-87-09	Evaluation of Modified Hi-Vols for PAH Analysis	223
TO-I-87-10	Measurement of Deposition of Organic Compounds Due to Long Range Transport of Pollutants	224
TO-I-87-12	Broad Range Screening Method for Phenol Speciation	225
TO-I-87-13	Routine Method for Analysis of Resin and Fatty Acids for the Paper and Pulp Industry	226
WQ-I-87-01	Robotics for Dissolved Oxygen Measurement in the Biochemical Oxygen Demand Test (BOD Test)	227

PROJECT NO.	TITLE	PAGE
WQ-I-87-02	Robotics for Weight Measurement in Solids Test	228
WQ-I-87-03	Development of 15 Methods for Technicon TAAC Colourimetric Systems	229
WQ-I-87-04	Robotics for Subaliquoting Station for Inorganic Tests	230

Date: April 22, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Investigation of the use of the Aqueous Phase Liquid Extractor (APLE) for ultra trace organic sampling of water for determination of chlorinated dibenzo-p-dioxins/furans (CDD/CDF)
PROJECT NO: DWO-I-87-01
START DATE: (m/yr): July, 1987
RES. PRIORITY:

KEYWORDS: APLE, Organic, Water, CDD/CDF
MBR PROJECT CATEGORY: MBR 8-C

RESEARCH CATEGORY: INTERNAL X or EXTERNAL ___
Solicited ___ Contract ___
Unsolicited ___ Grant ___

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:

LIAISON OFFICER: (name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR: (name, location, phone no.) Sharon Suter, Laboratory Services Branch, Drinking Water Organics Section 235-5895

SUPERVISOR: Dr. Ray Clement, Senior Scientist 235-5896

OBJECTIVE(S): To develop rapid on-site methods of sampling and extraction of ultra-trace levels of organics, especially the chlorinated dibenzo-p-dioxins and furans.

PROJECT DESCRIPTION: The APLE sampler can extract up to 200 litres of water in the field in 1-2 hours using as little as 4 litres of solvent. Only the solvent needs to be transported back to the laboratory for analysis. Work will concentrate on analysis of chlorinated dioxins/furans in the particulate and aqueous components of pulp and paper effluents.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds:	Cost:				
	DOE ($000's):	7			7
Laboratory Services Branch	Salaries and Benefits ($000's) :	18			18
	Total ($000):	25			25
	Man years: (internal)	0.5			0.5

OUTPUT (papers, presentations, reports): papers, report, conference presentation

EXTERNAL PARTICIPATION (ministries, governments, agencies): Dave Hollinger, Northwestern Region, Ministry of the Environment

COMMENTS: Report available for initial work performed at Petit Flume

Date: April 23, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Comparison of Mass Spectral Instrumental Capabilities (Low Resolution Mass Spectrometer-LRMS, High RES. Resolution MS-HRMS, Mass Spectrometer, Mass Spectrometer-MSMS) for chlorinated Dibenzo-p-dioxin and Dibenzofuran Determination

PROJECT NO: DWO-I-87-02
START DATE: (m/yr):April, 1987
PRIORITY:

KEYWORDS: Dibenzo-p-Dioxin, Dibenzofuran, Mass spectrometry, LRMS, HRMS, MSMS

MBR PROJECT CATEGORY:

RESEARCH CATEGORY: INTERNAL X or EXTERNAL
Solicited ___ Contract ___
Unsolicited ___ Grant ___

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:

LIAISON OFFICER: (name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR: (name, location, phone no.)	Donna McCurvin Laboratory Services Branch Drinking Water Organics Section 235-5892
SUPERVISOR:	Dr. R.E. Clement, Senior Scientist Drinking Water Organics Section 235-5896

OBJECTIVE(S): To compare high resolution MS, Low resolution MS (MSD Finnigan 4500) and MS-MS capability for Dioxin/Furan Determination.

PROJECT DESCRIPTION: Instrument detection limits, linear dynamic range, and freedom from interferences for various sample types will be investigated. It is planned to define the degree of chemical work-up and type of instrumentation needed for special applications.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds:	Cost:				
	DOE ($000's):	7			7
Laboratory Services Branch	Salaries and Benefits ($000's) :	18			18
	Total ($000):	25			25
	Man years: (internal)	0.5			0.5

OUTPUT (papers, presentations, reports): Report, Journal Publication

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: A variety of Gas Chromatography - Mass Spectrometry equipment and techniques are available for chlorinated Dioxin/Furan determination. This work is needed to define the data characteristics of each technique and to determine the intercomparability of results.

Date: April 28, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Method Development for Aqueous Volatile Halocarbons Analysis at the Parts Per Trillion Level

PROJECT NO: DWO-E-87-03
START DATE: (m/yr): May, 1987
RES. PRIORITY:

KEYWORDS: Analysis, Halocarbons, Aqueous, Low Level

MBR PROJECT CATEGORY: MBR 8-C

RESEARCH CATEGORY: INTERNAL ___ or EXTERNAL X
Solicited ___ Contract X
Unsolicited ___ Grant ___

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:	Cecelia Chan, 890-2555 Mann Testing Laboratories Limited
LIAISON OFFICER: (name, location, phone no.)	O. William Berg, 235-5907 Laboratory Services Branch Drinking Water Organics Section 125 Resources Road, Rexdale

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To develop methodology for the quantitative routine analysis of ambient water for volatile halocarbon compounds in the low parts per trillion (w/w) range.

PROJECT DESCRIPTION: This method is to be developed with the Perkin-Elmer ATD-50 and its associated gas chromatograph equipped with an electron capture detector.

The lower detection limits will improve determination of the mobility of these compounds, the dilution effect, the distribution of these compounds, within industrial discharge plumes and the plume size several hundred metres, and more, downstream from the source.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds:	Cost:				
Laboratory Services Branch	DOE ($000's):				
	Salaries and Benefits ($000's) :				
	Total ($000):	30			30 (contract cost)
	Man years: (internal)				

OUTPUT (papers, presentations, reports):
Internal Report, External Publication

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

Date: April 22, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Stability Study of Chlorinated Dibenzo-p-dioxins and Dibenzofurans in Fish During Storage	PROJECT NO: DWO-I-87-03 START DATE: (m/yr): January,1987 RES. PRIORITY:

KEYWORDS: Fish, Storage, Dioxin	MBR PROJECT CATEGORY: MBR 8-C, MBR 9-C

RESEARCH CATEGORY: INTERNAL X or EXTERNAL ___
Solicited ___ Contract ___
Unsolicited ___ Grant ___

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:

LIAISON OFFICER: (name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR: (name, location, phone no.)	David Schellenberg Laboratory Services Branch, Drinking Water Organics Section 235-5894
SUPERVISOR:	Mr. Brian Bobbie, Supervisor Dioxin Laboratory 235-5890

OBJECTIVE(S): To determine the effect of freezer storage time on analytical results.

PROJECT DESCRIPTION: Up to two years or more can elapse before ground fish samples are analyzed. This study is needed to determine whether the analytical results obtained are consistent over this time period.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds:	Cost:				
	DOE ($000's):	5			5
Laboratory Services Branch	Salaries and Benefits ($000's) :	16			16
	Total ($000):	21			21
	Man years: (internal)	0.5			0.5

OUTPUT (papers, presentations, reports): paper

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: Work is needed to support Water Resources Branch - Fish Contaminants Program.

Date: April 29, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Solid Phase Extraction (SPE) of Organochlorines from Liquid Samples

PROJECT NO: DWO-E-87-04
START DATE: (m/yr): October,1987
RES. PRIORITY:

KEYWORDS: SPE, organochlorines, bonded silica

MBR PROJECT CATEGORY: MBR 1-C
MBR 2

RESEARCH CATEGORY: INTERNAL ___ or EXTERNAL X
Solicited ___ Contract X
Unsolicited ___ Grant ___

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION: To be determined

LIAISON OFFICER: (name, location, phone no.)
Dr. David Hall, Supervisor
Laboratory Services Branch
Drinking Water Organics 235-5910

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To develop methods to implement solid phase extractions (SPE) in the field for a variety of organic compounds.

PROJECT DESCRIPTION: Solid phase extractions involve passing water over a bonded silica material, drying and eluting with solvent, avoiding the time consuming liquid/liquid extraction concentration and cleanup. The work will initially centre on extending SPE of organochlorines to laboratory spiked samples, developing field sampling techniques, and obtaining quality control data on field samples including reproducibility, linearity, and comparison with conventional techniques.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds:	Cost: DOE ($000's): Salaries and Benefits ($000's) :				
Laboratory Services Branch	Total ($000):	60	60		120 (contract cost)
1	Man years: (internal)				

OUTPUT (papers, presentations, reports): internal report, external publication

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: This study is part of the Lab University Joint Research Venture Program. It is to be a joint developmental project between the Laboratory Services Branch and an Ontario University.

DI/DWO.6

Date: April 22, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Automated Cleanup Method for Dioxins in Fish

PROJECT NO: DWO-I-87-04
START DATE: (m/yr): October,1986
RES. PRIORITY:

KEYWORDS: Dioxins, Automated Cleanup

MBR PROJECT CATEGORY: MBR 9-C

RESEARCH CATEGORY: INTERNAL X or EXTERNAL ___
Solicited ___ Contract ___
Unsolicited ___ Grant ___

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:

LIAISON OFFICER: (name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR: (name, location, phone no.)	Colleen Tashiro LSB DWO Section 235-5895	Joan Crowther LSB Water Quality Section 235-5868
SUPERVISOR:	Dr. Ray Clement, Senior Scientist Drinking Water Organics Section 235-5896	

OBJECTIVE(S): The study includes 2 phases:
Phase I: Develop improved fish cleanup based on carbon adsorbents
Phase II: Automate cleanup to allow overnight sample processing

PROJECT DESCRIPTION:

I. Investigate the use of carbon fibre as adsorbents for the cleanup of fish tissue to improve recovery of dioxins and furans.

II. After the optimization of Phase I, the method will be automated by the use of robotics to allow increased sample throughput.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds:	Cost:				
	DOE ($000's):	9			9
Laboratory Services Branch	Salaries and Benefits ($000's) :	25			25
	Total ($000):	34			34
	Man years: (internal)	0.7			0.7

OUTPUT (papers, presentations, reports): report, journal publication

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: Work initiated to support Water Resources Branch - Fish Contaminants Program. Results should be applicable to other sample types

Date: April 29, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Development of Gas Chromatograph/Mass Spectrometer (GC/MS) Data Processing Capabilities
PROJECT NO: DWO-E-87-05
START DATE: (m/yr): 1987
RES. PRIORITY:

KEYWORDS: compound identification, high resolution, mass spectrometry
MBR PROJECT CATEGORY: ALL

RESEARCH CATEGORY: INTERNAL ___ or EXTERNAL X
Solicited ___ Contract X
Unsolicited ___ Grant ___

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION: To be determined

LIAISON OFFICER: (name, location, phone no.) Dr. V. Taguchi, Supervisor Mass Spectrometry
Laboratory Services Branch, DWO Section
235-5902

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): 1. To improve data processing capabilities of the GC/MS data systems. 2. To prepare a data base of chemical information for all organic compounds detected by GC/MS. 3. To develop programs to provide customized reports of analytical data.

PROJECT DESCRIPTION: The Mass Spectrometry laboratory possesses four GC/MS data systems including a high resolution MS and an automated GC, for organic analyses. The goal of this project is to develop procedures to improve the data processing capabilities of the systems.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds: Laboratory Services Branch	Cost: DOE ($000's): Salaries and Benefits ($000's) :				
	Total ($000):	30	30		60 (contract cost)
	Man years: (internal)				

OUTPUT (papers, presentations, reports): internal report, external publication

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: This study is part of the Laboratory University Joint Research Venture Program. It is to be a joint developmental project between the Laboratory Services Branch and an Ontario University.

Date: April 22, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Method Development for the Determination of Chlorinated Dibenzo-p-dioxins and Dibenzofurans in Ambient Air.

PROJECT NO: DWO-I-87-05
START DATE: (m/yr): October,1987
RES. PRIORITY:

KEYWORDS: Chlorinated Dibenzo-p-dioxins Dibenzofuran, Ambient Air, Sampling

MBR PROJECT CATEGORY: MBR 13

RESEARCH CATEGORY: INTERNAL X or EXTERNAL ___
Solicited ___ Contract __
Unsolicited ___ Grant __

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:

LIAISON OFFICER: (name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR: (name, location, phone no.)	Colleen Tashiro LSB DWO Section 235-5897	Dr Akos Szakolcai Emission Tech and Regulation Section Air Resources Branch 965-1634
SUPERVISOR:	Dr. Ray Clement, Sr. Scientist Drinking Water Organics 235-5896	

OBJECTIVE(S): To develop a method for the determination of dioxins and furans in ambient air so that the transport of dioxins/furans in the atmosphere can be studied.

PROJECT DESCRIPTION: A method for the determination of dioxins in ambient air in co-operation with Air Resources Branch is being developed using polyurethane foam plugs in HiVol samplers. High and low level spiked filters will be tested to determine recoveries and ambient air levels. Extraction method development is also necessary.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds:	Cost: DOE ($000's):	9			9
	Salaries and Benefits ($000's) :	25			25
Laboratory Services Branch	Total ($000):	34			34
	Man years: (internal)	0.7			0.7

OUTPUT (papers, presentations, reports): report, paper

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: Work is needed to support Air Resources Branch studies and regional monitoring needs.

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Development of Software for the Automated Interpretation of Gas Chromatography-Mass Spectrometry (GC-MS) Analysis of Chlorinated Dibenzo-p-dioxins & Dibenzofurans (CDD/CDF)

PROJECT NO: DWO-E-87-06
START DATE: (m/yr): 1987
RES. PRIORITY:

KEYWORDS: GC-MS, Dioxin, Software
MBR PROJECT CATEGORY: ALL

RESEARCH CATEGORY: INTERNAL ___ or EXTERNAL X
Solicited ___ Contract X
Unsolicited ___ Grant ___

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION: To be determined

LIAISON OFFICER: (name, location, phone no.) Dr. Ray Clement & Stephen Davies
Laboratory Services Branch, DWO Section
235-5890

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To improve software in order to increase GC-MS analytical throughput. The ultimate goal is to create an unattended automated processing environment for the GC-MS analysis of CDD's and CDF's culminating with automatic report generation.

PROJECT DESCRIPTION: Software improvements will include the following: 1) replacement of manual interactive data interpretation procedures with automated software routines wherever possible; 2) improved algorithms to identify CDD/CDF; 3) automated quantitation of CDD/CDF; and 4) automated report generation.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds:	Cost:				
	DOE ($000's):				
Laboratory Services Branch	Salaries and Benefits ($000's) :				
	Total ($000):	80			80 (contract cost)
	Man years: (internal)				

OUTPUT (papers, presentations, reports): internal report, external publication

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: This study is part of the Laboratory University Joint Research Venture Program. It is to be a joint developmental project between the Laboratory Services Branch and an Ontario University.

Date: April 22, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Investigation of Chlorinated Dibenzo-p-dioxins and Dibenzofurans in Atmospheric Deposition

PROJECT NO: DWO-I-87-06
START DATE: (m/yr):November,1986
RES. PRIORITY:

KEYWORDS: Chlorinated Dibenzo-p-dioxins, Dibenzofurans, Toxic Rain, Atmospheric Deposition

MBR PROJECT CATEGORY: MBR 13

RESEARCH CATEGORY:	INTERNAL X or	EXTERNAL	
		Solicited ___	Contract ___
		Unsolicited ___	Grant ___

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:

LIAISON OFFICER: (name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR: (name, location, phone no.)	Colleen Tashiro LSB DWO Section 235-5897	Maris Lusis Air Resources Branch Air Quality & Meteorology Section 965-1634
SUPERVISOR:	Dr. Ray Clement Senior Scientist DWO Section 235-5896	

OBJECTIVE(S): A. To determine the presence/absence of dioxins/furans in toxic precipitation samples by collecting precipitation over an extended period & at various locations. B. To determine if there are losses of dioxins/furans to the glass bottle walls during extended storage periods

PROJECT DESCRIPTION: A. Precipitation samples are collected for 28 day periods either directly or through an XAD cartridge. The samples are extracted, cleaned-up and analyzed by gas chromatography-mass spectrometry for dioxins/furans. B. Dioxin spiked water samples are stored for varying periods of time, then extracted and analyzed to determine if wall losses of dioxins are occuring with extended collection/storage periods.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds:	Cost:				
	DOE ($000's):	7			7
Laboratory Services Branch	Salaries and Benefits ($000's) :	18			18
	Total ($000):	25			25
	Man years: (internal)	0.5			0.5

OUTPUT (papers, presentations, reports): 2 papers, 1 presentation
1 report

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: Work is needed to support Air Resources Branch programs.

Date: April 23, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Investigation of Volatiles Loss/Degradation in Fish/Sediment During Storage	PROJECT NO: DWO-I-87-07 START DATE: (m/yr): July, 1987 RES. PRIORITY:

KEYWORDS: Volatiles, Fish, Sediment, Storage	MBR PROJECT CATEGORY: MBR 8-C

RESEARCH CATEGORY: INTERNAL X or EXTERNAL ___
Solicited ___ Contract ___
Unsolicited ___ Grant ___

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:

LIAISON OFFICER: (name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR: (name, location, phone no.)	Steve Jenkins Laboratory Services Branch Drinking Water Organics Section 235-5903
SUPERVISOR:	Dr. Vince Taguchi, Supervisor Mass Spec Lab 235-5902

OBJECTIVE(S): To determine volatile organics loss in prepared fish tissue and sediment, stored at sub-0°C temperature over various time periods.

PROJECT DESCRIPTION: Fish will be prepared by present protocol. The blended tissue will be divided into sub-samples of approx. 10g. each and stored in glass vials (with teflon/silicone liners) at sub-0°C levels. At various time periods (i.e. 0 day, 1 day, 1 week, 2 week, 3 week, 5 week, 10 week), the tissue will be analyzed by purge + trap gas chromatography-mass spectrometry. The change in chromatographic fingerprint will be analyzed.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds:	Cost:				
	DOE ($000's):	8			8
Laboratory Services Branch	Salaries and Benefits ($000's) :	21			21
	Total ($000):	29			29
	Man years: (internal)	0.6			0.6

OUTPUT (papers, presentations, reports): report, journal publication

EXTERNAL PARTICIPATION (ministries, governments, agencies): Sampling performed by staff of Water Resources Branch, Ministry of Environment

COMMENTS: Results are required for interpretation of data generated by the Water Resources Branch Programs.

Date: April 23, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Development and Automation of a High Performance Liquid Chromatograph (HPLC) Method for the Analysis of PAH's in Drinking Waters

PROJECT NO: DWO-I-87-09
START DATE: (m/yr): March,1987
RES. PRIORITY:

KEYWORDS: HPLC, PAH's, Drinking Water

MBR PROJECT CATEGORY: MBR 1-C, MBR 2

RESEARCH CATEGORY: INTERNAL X or EXTERNAL ___
Solicited ___ Contract ___
Unsolicited ___ Grant ___

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:

LIAISON OFFICER: (name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR: (name, location, phone no.)	Patrick W. Crozier Laboratory Services Branch Drinking Water Organics Section 235-5911
SUPERVISOR:	Dr. C.D. Hall, Supervisor Organic Water Unit Drinking Water Organics Section 235-5910

OBJECTIVE(S): To develop and automate a HPLC method for the analysis of PAH's in drinking waters.

PROJECT DESCRIPTION: Development of extraction and automated HPLC analysis techniques for the analysis of 17 PAH's in drinking waters.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds:	Cost:				
	DOE ($000's):	7			7
Laboratory Services Branch	Salaries and Benefits ($000's) :	18			18
	Total ($000):	25			25
	Man years: (internal)	0.5			0.5

OUTPUT (papers, presentations, reports): Incorporation into Hames Manual, Journal Paper

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

Date: April 23, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Feasibility Study for the Analysis of Toxaphene in Drinking Waters.

PROJECT NO: DWO-I-87-10
START DATE: (m/yr): April,1987
RES. PRIORITY:

KEYWORDS: toxaphene, drinking water, analytical method development

MBR PROJECT CATEGORY: MBR 1-C, MBR 2

RESEARCH CATEGORY: INTERNAL X or EXTERNAL ___
Solicited ___ Contract ___
Unsolicited ___ Grant ___

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:

LIAISON OFFICER: (name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR: (name, location, phone no.)	Patrick W. Crozier Laboratory Services Branch Drinking Water Organics Section 235-5911
SUPERVISOR:	Dr. C.D. Hall, Supervisor Organic Water Unit Drinking Water Organics Section 235-5910

OBJECTIVE(S): To investigate the feasibility and if possible implement methods for the analysis of toxaphene in drinking waters.

PROJECT DESCRIPTION: Development of extraction, clean-up and analysis methods for toxaphene in drinking waters, particularly methods of quantitation.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds:	Cost:				
	DOE ($000's):	14			14
Laboratory Services Branch	Salaries and Benefits ($000's) :	11			11
	Total ($000):	25			25
	Man years: (internal)	0.3			0.3

OUTPUT (papers, presentations, reports): Incorporation into Hames Manual

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: Presently under investigation.

Date: April 21, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Identification of Unknown Organic Contaminants by High Resolution Mass Spectrometry (HRMS)

PROJECT NO: DWO-I-87-12
START DATE: (m/yr): March, 1987
RES. PRIORITY:

KEYWORDS: compound identification, high resolution, mass spectrometry

MBR PROJECT CATEGORY: ALL

RESEARCH CATEGORY: INTERNAL X or EXTERNAL ___
Solicited ___ Contract ___
Unsolicited ___ Grant ___

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:

LIAISON OFFICER: (name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR: (name, location, phone no.)
Dr. Eric Reiner, Research Scientist
Laboratory Services Branch
Drinking Water Organics Section

SUPERVISOR:
Dr. V.Y. Taguchi
Supervisor Mass Spectrometry Unit
235-5902

OBJECTIVE(S): To identify unknown organic environmental contaminants using high resolution mass spectrometric techniques.

PROJECT DESCRIPTION: Use advanced instrumentation (ZAB-2F) to identify organic environmental contaminants not analyzable by conventional low resolution mass spectrometric techniques. Sophisticated techniques including high resolution MS (accurate mass determinations), Mass spectrometer-Mass spectrometer (MS-MS), linked scanning and Mass Analyzed Ion Kinetic Spectrum (MIKES) will be employed.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds:	Cost:				
	DOE ($000's):	13			13
Laboratory Services Branch	Salaries and Benefits ($000's) :	35			35
	Total ($000):	48			48
	Man years: (internal)	1.0			1.0

OUTPUT (papers, presentations, reports): A number of papers which will describe results from unknown samples using the above method.

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: HRMS full scan library searching and accurate mass determinations have been accomplished using Gas Chromatography-Mass Spectrometry (GC-MS) standards and mixtures. Linked scans and MIKES have been accomplished using the heated liquid inlet. Gas chromatograph/mass spectrometer MIKES may require hardware changes.

Date: May 5, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Tracer Studies Using ICP/MS Isotope Ratios: Air Particulate
PROJECT NO: ITC-I-87-01
START DATE: (m/yr): April 1986
RES. PRIORITY:

KEYWORDS: ICP/MS Isotope Ratios
Air Particulate
MBR PROJECT CATEGORY: MBR 13

RESEARCH CATEGORY: INTERNAL X or EXTERNAL ___
Solicited ___ Contract __
Unsolicited ___ Grant __

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:

LIAISON OFFICER: (name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR: (name, location, phone no.)	D. Boomer LSB ITC Section 235-5858	Len Barrie AES Federal Government 667-4785
SUPERVISOR:	D. Boomer, Supervisor Inorganic Trace Contaminants Section 235-5858	

OBJECTIVE(S): To investigate the feasibility of using isotope ratios to identify and discriminate various sources of pollution.

PROJECT DESCRIPTION: A method has been developed for the analysis of air particulate. Pb206/207 ratios have been measured in a group of samples from Dorset, Ontario. The isotope ratios correlate with air mass trajectories.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds:	Cost:				
	DOE ($000's):	25	25	1	51
Laboratory Services Branch	Salaries and Benefits ($000's) :	2	2	3	7
	Total ($000):	27	27	4	58
	Man years: (internal)	<1	<1	<1	<1

OUTPUT (papers, presentations, reports): Presentations at AOAC Ottawa and TCS/Toronto/Muskoka in addition to that presented by L. Barrie. Other dependent upon further research.

EXTERNAL PARTICIPATION (ministries, governments, agencies):
AES (Federal Government) Len Barrie

COMMENTS: This technique will become useful in LRTAP and APIOS work.

Date: May 5, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: ICP/MS Analytical Development
PROJECT NO: ITC-E-87-02
START DATE: (m/yr): Jan. 1987
RES. PRIORITY:

KEYWORDS: ICP/MS, Optimization
MBR PROJECT CATEGORY: N/A

RESEARCH CATEGORY: INTERNAL ___ or EXTERNAL X
Solicited X Contract X
Unsolicited ___ Grant __

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION: Dr. B. McNutt
McMaster University

LIAISON OFFICER: (name, location, phone no.) Dave Boomer
Laboratory Services Branch
Inorganic Trace Contaminants 235-5858

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR: (name, location, phone no.)

SUPERVISOR:

OBJECTIVE(S): To investigate the analytical capabilities of the ICP/MS with emphasis on environmental analysis.

PROJECT DESCRIPTION: Various aspects of the instrumentation will be investigated and developed. Project items include optimization of analytical conditions using simplex techniques, investigation of negative ion capability for determination of negative ions (sulfur and halogens) and application to tracer analysis and source allocation in precipitation samples; and optical, ICP/MS interface to determine added elements.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds: Laboratory Services Branch	Cost:				
	DOE ($000's):				
	Salaries and Benefits ($000's) :				
	Total ($000):	50	50	50	150 (contract cost)
	Man years: (internal)				

OUTPUT (papers, presentations, reports): Report

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: This study is part of the Laboratory/University Joint Research Venture Program. It is to be a joint development project between the Laboratory Services Branch and an Ontario University.

Date: May 6, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Determination of Arsenic, Selenium and Antimony in Environmental Matrices by Flow Injection Analyzer (FIA)-Hydride Flameless Atomic Absorption Spectrophotometric (FAAS) Techniques

PROJECT NO: ITC-I-87-02
START DATE: (m/yr): June, 1987
RES. PRIORITY:

KEYWORDS: Arsenic, Selenium, Antimony, FIA, Hydride FAAS

MBR PROJECT CATEGORY: MBR 8-C

RESEARCH CATEGORY: INTERNAL X or EXTERNAL ___
Solicited ___ Contract ___
Unsolicited ___ Grant ___

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:

LIAISON OFFICER: (name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR: (name, location, phone no.)
R. Sadana and A. Snobel
Laboratory Services Branch
Inorganic Trace Contaminants Section
235-5861 - 235-5845

SUPERVISOR:
R. Sadana
Inorganic Trace Contaminants Section
235-5861

OBJECTIVE(S): To develop a routine semi-automated method for the determination of arsenic, selenium and antimony at ultra-trace concentrations in environmental samples.

PROJECT DESCRIPTION: The object is to develop a fast routine method for the determination of arsenic, selenium, and antimony in environmental matrices by interfacing FIA with the Hydride FAAS. Low detection limits will be achieved and will assist the client groups in establishing background levels of the above elements.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds:	Cost:				
	DOE ($000's):	6			6
Laboratory Services Branch	Salaries and Benefits ($000's) :	20			20
	Total ($000):	26			26
	Man years: (internal)	.5			.5

OUTPUT (papers, presentations, reports): Internal Report

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

Date: May 6, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: The Application of Robotics for the Digestion of Fish Samples for Mercury Analysis

PROJECT NO: ITC-I-87-03
START DATE: (m/yr): June, 1987
RES. PRIORITY:

KEYWORDS: Fish, Mercury, Digestion, Robotics

MBR PROJECT CATEGORY: MBR 8-C
MBR 9-C

RESEARCH CATEGORY: INTERNAL X or EXTERNAL
Solicited ___ Contract ___
Unsolicited ___ Grant ___

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:

LIAISON OFFICER: (name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR: (name, location, phone no.)	R. Sadana and R. Hillier Laboratory Services Branch Inorganic Trace Contaminants Section 235-5861 - 235-5845
SUPERVISOR:	R. Sadana Inorganic Trace Contaminants Section 235-5861

OBJECTIVE(S): To develop an automated fish digestion procedure by using robotics.

PROJECT DESCRIPTION: To develop an automated sample digestion procedure for biomaterials using robotics. It will shorten turnaround time for mercury analys~~e~~is, thus achieving higher productivity.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds:	Cost:				
	DOE ($000's):	19	19		38
Laboratory Services Branch	Salaries and Benefits ($000's) :	13	13		26
	Total ($000):	32	32		64
	Man years: (internal)	.25	.25		.50

OUTPUT (papers, presentations, reports): External Publication

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

Date: April 30, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Microwave Digestion of Vegetation and Soil Samples

PROJECT NO: ITC-I-87-07
START DATE: (m/yr): November/86
RES. PRIORITY:

KEYWORDS: Microwave, Vegetation, Soil, Metals, Digestion

MBR PROJECT CATEGORY: MBR 11-B
MBR 12-B

RESEARCH CATEGORY: INTERNAL X or EXTERNAL ___
Solicited ___ Contract ___
Unsolicited ___ Grant ___

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:

LIAISON OFFICER: (name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR: (name, location, phone no.)
L. Pastorek
Laboratory Services Branch
Inorganic Trace Contaminants Section
235-5855

SUPERVISOR:
L. Pastorek
Inorganic Trace Contaminants Section
235-5855

OBJECTIVE(S): To develop a routine sample preparation method using a microwave oven to replace present ashing, acid extraction system.

PROJECT DESCRIPTION: Parameters will be developed on the microwave system that will digest both soil and vegetation matrices and result in sample decomposition. Results of analysis of samples for heavy metals must match present method in accuracy and precision. QA/QC protocols will be established and a report produced. Time savings should result.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds: -Laboratory Services Branch -Federal Gov't.- UIC ( )*	Cost:				
	DOE ($000's):	5			5
	Salaries and Benefits ($000's) :	(18)*			(18)*
	Total ($000):	23			23
	Man years: (internal)				

OUTPUT (papers, presentations, reports): Internal Report, External Publication

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: * A section 38 project. Work is being carried out at the Laboratory Services Branch, Rexdale, Ontario.

Date: April 30, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Application of Robotics to Digestion of Vegetation and Soil Samples for Analysis of Metals

PROJECT NO: ITC-I-87-08
START DATE: (m/yr): May, 1987
RES. PRIORITY:

KEYWORDS: Robotics, Vegetation, Soil, Microwave, Metals

MBR PROJECT CATEGORY: MBR 11-B
MBR 12-B

RESEARCH CATEGORY: INTERNAL X or EXTERNAL ___
Solicited ___ Contract __
Unsolicited ___ Grant __

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:

LIAISON OFFICER: (name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR: (name, location, phone no.)
L. Pastorek
Laboratory Services Branch
Inorganic Trace Contaminants Section
235-5855

SUPERVISOR:
L. Pastorek
Inorganic Trace Contaminants Section
235-5855

OBJECTIVE(S): To apply a robotic system to a microwave digestion technique used for vegetation and soil sample preparation for metal analysis.

PROJECT DESCRIPTION: A robotic system will be set up to interact with a microwave oven by weighing samples, dispensing acids, placing samples into and taking them out of the oven. The computer component will register sample weights for calculation of final concentration of metals present. Time savings should result.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds:	Cost:				
	DOE ($000's):	16			16
Laboratory Services Branch	Salaries and Benefits ($000's) :	30			30
	Total ($000):	46			46
	Man years: (internal)	1.1			1.1

OUTPUT (papers, presentations, reports): Internal & External Reports

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

Date: May 5, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: ICP/MS Development of Method for Analysis of Drinking Water For Elements.

PROJECT NO: ITC-I-87-11
START DATE: (m/yr): May, 1986
RES. PRIORITY:

KEYWORDS: ICP/MS Multielement, Drinking Water

MBR PROJECT CATEGORY: MBR 1
MBR 2

RESEARCH CATEGORY: INTERNAL X or EXTERNAL ___
Solicited ___ Contract ___
Unsolicited ___ Grant ___

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:

LIAISON OFFICER: (name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR: (name, location, phone no.)
D. Boomer
LSB
ITC Section
235-5858

SUPERVISOR:
D. Boomer, Supervisor
Inorganic Trace Contaminants Section
235-5858

OBJECTIVE(S): To develop a sensitive accurate method for the direct analysis of drinking water for elemental composition.

PROJECT DESCRIPTION: Instrumental parameters have been optimized. Matrix effects have been investigated and minimized. Computer programs have been written to process the data. Intercomparisons and spike studies are being completed. Further development will extend the range of application to surface water.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds:	Cost:				
	DOE ($000's):	7	7		14
Laboratory Services Branch	Salaries and Benefits ($000's) :	35	35		70
	Total ($000):	42	42		84
	Man years: (internal)	1.2	1.2		2.4

OUTPUT (papers, presentations, reports): Internal Reports, Presentation at Conferences.

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

Date: May 5, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Development of New Low Volume Sampling System using Teflon Filters for Trace Metals Analysis of Air Samples by X-Ray Fluorescence Spectrometry

PROJECT NO: ITC-I-87-12
START DATE: (m/yr): 1987
RES. PRIORITY:

KEYWORDS: Low Volume Sampling, Trace Metals, XRF, Teflon Filters

MBR PROJECT CATEGORY: MBR 11-B
MBR 12-B

RESEARCH CATEGORY: INTERNAL X or EXTERNAL ___
Solicited ___ Contract ___
Unsolicited ___ Grant ___

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:

LIAISON OFFICER: (name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR: (name, location, phone no.)
TW J. Hipfner and R. Moody
Laboratory Services Branch
Inorganic Trace Contaminants Section
235-5856 - 235-5863

SUPERVISOR:
~~B. Loescher, Manager~~
Inorganic Trace Contaminants Section
235-5848

OBJECTIVE(S): Current revisions to regulation 308 will require the Ministry to beable to analyze for a wider range of inorganic parameters on air filters. This project will develop and evaluate teflon filter media for collection of air samples to be analyzed for trace metals and TSP by X-ray, thus improving efficiency & throughput of analysis in support of air quality monitoring programs.

PROJECT DESCRIPTION: Project activities include: 1) choice & establishment of sampling stations for purposes of comparison of systems; 2) development of analytical method for XRF; 3) analysis of samples by current methods including atomic absorption spectrophotometry (AAS) and ion chromatography (IC); 4) statistical analysis of data; and 5) establishment of QA/QC protocols.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds:	Cost:				
	DOE ($000's):	1			1
-Laboratory Services Branch	Salaries and Benefits ($000's) :	(18)* 6			(18)* 6
	Total ($000):	25			7
-Federal Gov't. - UIC ( )*	Man years: (internal)	.1			.1

OUTPUT (papers, presentations, reports): Method Report and Summary

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: * A Section 38 Project

DI/ITC.1

Date: May 12, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Development of Methods for the Determination of Electroactive Species such as CN^-, S=, by Ion Chromatography.

PROJECT NO: ITC-I-87-14
START DATE: (m/yr): June, 1987
RES. PRIORITY:

KEYWORDS: Ion Chromatography, Cyanide, Sulfide

MBR PROJECT CATEGORY: MBR 1-C, MBR 4-B, MBR 8-B, MBR 9-B

RESEARCH CATEGORY: INTERNAL X or EXTERNAL
Solicited ___ Contract ___
Unsolicited ___ Grant ___

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:

LIAISON OFFICER: (name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR: (name, location, phone no.)
D/J. Hipfner, Supervisor
Laboratory Services Branch
Inorganic Trace Contaminants Section
235-5856

SUPERVISOR:
~~B. Loescher~~, Manager
Inorganic Trace Contaminants Section
235-5848

OBJECTIVE(S): To develop working methods for the determination of electroactive species such as CN^- and S= in environmental samples by ion chromatography.

PROJECT DESCRIPTION: Published techniques for the determination of electroactive species such as CN^- and S= by electrochemical detection and ion chromatography will be rigorously investigated to develop working methods for these two ions in particular. The investigation will include a study of all flow and separation parameters such as pH and eluant composition as well as optimum reduction voltages.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds:	Cost:				
	DOE ($000's):	12			12
Laboratory Services Branch	Salaries and Benefits ($000's) :	13			13
	Total ($000):	25			25
	Man years: (internal)	.2			.2

OUTPUT (papers, presentations, reports): Analytical Methods Changes, Potential Paper

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

Date: April 28, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Super Critical Fluid Extraction & Development of Methodology	PROJECT NO: TO-E-87-01 START DATE: (m/yr): 1987 RES. PRIORITY:

KEYWORDS: SCF, Extraction	MBR PROJECT CATEGORY: MBR 14-b

RESEARCH CATEGORY: INTERNAL X and EXTERNAL X
Solicited ___ Contract X
Unsolicited ___ Grant ___

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:	To be determined
LIAISON OFFICER: (name, location, phone no.)	Ian Carter, Trace Organics Section Laboratory Services Branch, 125 Resources Rd. 235-5757
INTERNAL PROJECTS PRINCIPAL INVESTIGATOR: (name, location, phone no.)	
SUPERVISOR:	

OBJECTIVE(S): To develop and assess the range of applications of SCF extraction techniques for trace organics in solid matrices.

PROJECT DESCRIPTION: Use of existing MOE equipment and supplies on or off-site (off-site preferable) to develop the SCF extracts for trace organics in sediments or vegetation.

To document procedures and data gathered as a method.

To expand current areas of analysis for highly volatile or low extractability compounds.

BUDGET AND RESOURCES: Laboratory Services Branch	Year:	1	2	3	Total
	Cost:				
	DOE ($000's):	5	5		10
	Salaries and Benefits ($000's) :	5	5		10
	Contract Cost:	15	15		30
	Total ($000):	25	25		50
	Man years: (internal)	0.1	0.1		0.2

OUTPUT (papers, presentations, reports): Report and possible presentation on this technique at scientific conferences (AOAC, Pesticides Conference, Tech. Transfer)

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: This study is part of the Lab University Joint Research Venture Program. It is to be a joint development project between the Laboratory Services Branch and an Ontario University.

Date: April 28, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Chemical Characterization by Fourier Transform Infrared Spectroscopy (FT-IR)
PROJECT NO: TO-I-87-01
START DATE: (m/yr): May/1987
RES. PRIORITY:

KEYWORDS: FT-IR, Trace Org.
MBR PROJECT CATEGORY: MBR 4b, MBR 14b, MBR 15

RESEARCH CATEGORY: INTERNAL _X_ or EXTERNAL ___
Solicited ___ Contract ___
Unsolicited ___ Grant ___

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:

LIAISON OFFICER: (name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR: (name, location, phone no.)
Mira Petranovic, George Wyhovszky
Trace Organic Section
Laboratory Services Branch
235-5758

SUPERVISOR: J. Osborne, Trace Organics Sec., Lab Ser. Br

OBJECTIVE(S): To adapt, develop and assess spectroscopy techniques in environmental pollution utilizing Fourier Transform Infrared Spectroscopy

PROJECT DESCRIPTION: To adopt for routine use a recently purchased FT-IR Spectrophotometer and utilize the advantages of the new analytical system (higher speed, better sensitivity, fast electronic data collection data manipulation and storage). Implement FT-IR for characterization of waste samples and for litigation purposes.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds: Laboratory Services Branch,	Cost:				
	DOE ($000's):	28			28
	Salaries and Benefits ($000's) :	8			8
	Total ($000):	36			36
	Man years: (internal)	0.2			0.2

OUTPUT (papers, presentations, reports):
Internal report

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

Date: April 28, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Diffuse Reflectance Infrared Fourier Transform Spectroscopy (Drift)	PROJECT NO: TO-I-87-02 START DATE: (m/yr): May/1987 RES. PRIORITY:

KEYWORDS: Drift - FT-IR

MBR PROJECT CATEGORY: MBR 15

RESEARCH CATEGORY: INTERNAL X or EXTERNAL ___ Solicited ___ Unsolicited ___ Contract ___ Grant ___

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:

LIAISON OFFICER: (name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR: (name, location, phone no.)
Mira Petranovic and George Wyhovszky
Trace Organics Section, Lab Services Br.
125 Resources Rd.
235-5758

SUPERVISOR: J. Osborne, Trace Organics Sec., Lab Ser Br

OBJECTIVE(S): To establish applications of a new optical sampling device capable of direct examination of solid powders

PROJECT DESCRIPTION: The technique under investigation is expected to be a major time saver on sample preparation and will provide a major improvement of the analytical procedures identifying a wide range of solid materials.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds: Laboratory Services Branch	Cost:				
	DOE ($000's):				
	Salaries and Benefits ($000's) :	4			4
	Total ($000):	29			29
	Man years: (internal)	0.1			0.1

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

Date: April 28, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Introduction of Gas Chromatography Fourier Transform Infrared Spectroscopy (GC-FTIR) for Mixed Waste Analysis

PROJECT NO: TO-I-87-03
START DATE: (m/yr): Aug/1987
RES. PRIORITY:

KEYWORDS: GC-FTIR

MBR PROJECT CATEGORY: MBR 4c, 9c 15a, 8c, 14b

RESEARCH CATEGORY: INTERNAL X or EXTERNAL ___
Solicited ___ Contract ___
Unsolicited ___ Grant ___

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:

LIAISON OFFICER:
(name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR:
(name, location, phone no.)
Mira Petranovic, George Wyhovszky
Trace Organics Section
Laboratory Services Branch
235-5758

SUPERVISOR: J. Osborne, Trace Organics Sec., Lab Ser Br.

OBJECTIVE(S): To combine a powerful separation technique (GC) with a diagnostic analytical instrument (infrared) for identification of volatile organic compounds in mixed wastes.

PROJECT DESCRIPTION:
To develop practical analytical methods for characteriztion and identification of major volatile organic compounds present in wastes from unknown sources.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds: Laboratory Services Branch	Cost:				
	DOE ($000's):	35			35
	Salaries and Benefits ($000's) :	25			25
	Total ($000):	60			60
	Man years: (internal)	0.6			0.6

OUTPUT (papers, presentations, reports): Internal Report

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

Date: April 28, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Evaluation of "TOX" Analyser for on-site monitoring of Chlorinated Organics in Leachate

PROJECT NO: TO-1-87-05
START DATE: (m/yr): April/87
RES. PRIORITY:

KEYWORDS: TOX Analyser, Chlorinated Organics, Leachate

MBR PROJECT CATEGORY: MBR 9.c

RESEARCH CATEGORY: INTERNAL X or EXTERNAL __
Solicited __ Contract __
Unsolicited __ Grant __

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:

LIAISON OFFICER:
(name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR:
(name, location, phone no.)
D. Toner, Trace Organics Section
Laboratory Services Branch
125 Resources Rd.
235-5759

SUPERVISOR: J. Osborne, Trace Organics Sec., Lab Ser Br

OBJECTIVE(S):
1. Develop methodology for field applications.
2. Documentation of adequate QC/QA

PROJECT DESCRIPTION: Project will entail evaluation/modification of the conventional "TOX" analyser for mobile laboratory operations. If successful, unit will provide enhanced technical support for the monitoring of clean-up operations at contentious issue landfill and chemical spill sites.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds: -Laboratory Services Branch -Federal Gov't.- UIC ( )*	Cost:				
	DOE ($000's):	5			5
	Salaries and	(8)*			(8)*
	Benefits ($000's) :	20			20
	Total ($000):	33			33
	Man years: (internal)	0.5			0.5

OUTPUT (papers, presentations, reports):
Internal report

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: *A Section 38 Project

Date: April 28, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Development and Evaluation of Micro Extraction/Clean-up techniques for Mobile Lab Implementation
PROJECT NO: TO-I-87-06
START DATE: (m/yr): April/87
RES. PRIORITY:

KEYWORDS: Micro Extraction/Clean-up
Mobile Lab
MBR PROJECT CATEGORY: MBR 9.c

RESEARCH CATEGORY: INTERNAL x or EXTERNAL
Solicited ___ Contract __
Unsolicited ___ Grant __

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:

LIAISON OFFICER:
(name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR: (name, location, phone no.)
J. Osborne, Trace Organics Section
Laboratory Services Branch
125 Resources Rd.
235-5759

SUPERVISOR: J. Osborne, Trace Organics Sec., Lab Ser. Br

OBJECTIVE(S): 1. To adapt existing methodology for Mobile operations. 2. To investigate solid adsorbant extractants for field use.

PROJECT DESCRIPTION: To investigate the downsizing of conventional extraction and clean-up technology for mobile laboratory operations. As well, project will investigate the use of solid adsorbants for field applications in groundwater analysis.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds: -Laboratory Services Branch -Federal Gov't.- UIC ( )*	Cost:				
	DOE ($000's):	5			5
	Salaries and Benefits	(8)*			(8)*
	($000's) :	30			30
	Total ($000):	43			43
	Man years: (internal)	1			1

OUTPUT (papers, presentations, reports):
Internal Report

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: * A Section 38 Project

Date: April 28, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Mass Selective Detector (MSD) for Mobile Laboratory Use
PROJECT NO: TO-I-87-07
START DATE: (m/yr): April/87
RES. PRIORITY:

KEYWORDS: M.S.D., Mobile Laboratory
MBR PROJECT CATEGORY: MBR9.b

RESEARCH CATEGORY: INTERNAL x or EXTERNAL ___
Solicited ___ Contract ___
Unsolicited ___ Grant ___

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:

LIAISON OFFICER:
(name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR:
(name, location, phone no.)
Dan Toner, Trace Organics Section
Laboratory Services Branch
125 Resources Rd.
235-5759

SUPERVISOR: J. Osborne, Trace Organics Sec, Lab Ser Br.

OBJECTIVE(S): Provision of MSD capability for Mobile Laboratory Operations

PROJECT DESCRIPTION: Installation and field evaluation of a MSD in a self contained mobile laboratory to be initiated during 1987/88. If successful, unit will provide enhanced and rapid field technical support.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds:	Cost:				
	DOE ($000's):	20			20
Laboratory Services Branch	Salaries and Benefits ($000's) :	40			40
	Total ($000):	60			60
	Man years: (internal)	1			1

OUTPUT (papers, presentations, reports):
Paper/Presentation

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

DI/TO.1

Date: April 28, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Evaluation of Purge and Trap and Headspace Techniques for on-site analysis of volatile organics in groundwater.

PROJECT NO: TO-I-87-08
START DATE: (m/yr): May/87
RES. PRIORITY:

KEYWORDS: Purge and Trap-Headspace-Volatile Organics

MBR PROJECT CATEGORY: MBR 9.c

RESEARCH CATEGORY: INTERNAL x or EXTERNAL
Solicited ___ Contract ___
Unsolicited ___ Grant ___

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:

LIAISON OFFICER:
(name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR:
(name, location, phone no.)
J. Osborne, Trace Organics Section
Laboratory Services Branch
125 Resources Rd.
235-5759

SUPERVISOR: J. Osborne, Trace Organics Sec., Lab Ser Br

OBJECTIVE(S): 1. Validation and Correlation of Analytical Techniques 2. Field Implementation 3. Improved Productivity.

PROJECT DESCRIPTION: To determine the correlation between purge & trap and head space analytical techniques for use in the on-site analysis of volatile organics in groundwater/leachate, etc.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds: -Laboratory Services Branch -Federal Gov't. - UIC ( )*	Cost:				
	DOE ($000's):	5			5
	Salaries and Benefits ($000's) :	(8)* 20			(8)* 20
	Total ($000):	33			33
	Man years: (internal)	0.5			0.5

OUTPUT (papers, presentations, reports):
Subject to Field Investigations.

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: *A Section 38 Project

Date: April 28, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Evaluation of Modified Hi-Vols for PAH Analysis
PROJECT NO: TO-I-87-09
START DATE: (m/yr): June/86
RES. PRIORITY:

KEYWORDS: PAH HI-VOL
MBR PROJECT CATEGORY: MBR 12.b

RESEARCH CATEGORY: INTERNAL x or EXTERNAL
Solicited ___ Unsolicited ___
Contract ___ Grant ___

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:

LIAISON OFFICER:
(name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR:
(name, location, phone no.)
S. Burns, Trace Organics Section
Laboratory Services Branch
125 Resources Rd.
231-5758

SUPERVISOR: B. Foster, Trace Organics Sec, Lab Ser. Br.

OBJECTIVE(S): 1. Method Validation 2. Implementation for Routine Operations 3. Provision of Accurate QC/QA Information

PROJECT DESCRIPTION: Standard Hi-Vol units were modified to accept an adsorbent field cartridge. The cartridges after exposure was extracted, cleaned up and analysed for a range of PAH's to determine the effects of ozone removal and artifact formation.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds: -Laboratory Services Branch -Federal Gov't.- UIC ( )*	Cost:				
	DOE ($000's):	5			5
	Salaries and	(8)*			(8)*
	Benefits ($000's) :	35			35
	Total ($000):	48			48
	Man years: (internal)				

OUTPUT (papers, presentations, reports):
Report - in conjunction with ARB

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: * A Section 38 Project

Date: April 28, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Measurement of Deposition of Organic Compounds due to Long Range Transport of Pollutants

PROJECT NO: TO-I-87-10
START DATE: (m/yr): July/86
RES. PRIORITY:

KEYWORDS: Long Range Atmospheric Deposition, PCB, DDT, Toxaphene

MBR PROJECT CATEGORY: MBR13.a

RESEARCH CATEGORY: INTERNAL x or EXTERNAL ___
Solicited ___ Contract ___
Unsolicited ___ Grant ___

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:

LIAISON OFFICER:
(name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR:
(name, location, phone no.)
S. Burns, Trace Organics Section
Laboratory Services Branch
125 Resources Road
235-5758

SUPERVISOR: ✓ B. Foster/J. Osborne, Trace Org. Sec., LSB

OBJECTIVE(S): 1. Method Validation 2. Implementation for Routine Operations 3. Provision of QC/QA data 4. Paper/Report Presentation

PROJECT DESCRIPTION: Ambient air and precipitation samples will be taken at selected Great Lakes locations and analysed for a range of chlorinated organics (PCB, DDT, Toxaphene), to determine the loading due to atmospheric deposition. Method will entail analyses in the sub ppt range.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds: Laboratory Services Branch	Cost:				
	DOE ($000's):	10	5		15
	Salaries and Benefits ($000's) :	50	100		150
	Total ($000):	60	105		165
	Man years: (internal)	1	2		3

OUTPUT (papers, presentations, reports):
Paper/Report to be prepared in conjunction with ARB

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

Date: April 28, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Broad Range Screening Method for Phenol Speciation
PROJECT NO: TO-I-87-12
START DATE: (m/yr): on-going
RES. PRIORITY:

KEYWORDS: Phenols, guaicols, catechols
MBR PROJECT CATEGORY: MBR 8c

RESEARCH CATEGORY: INTERNAL X or EXTERNAL ___
Solicited ___ Contract ___
Unsolicited ___ Grant ___

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:

LIAISON OFFICER:
(name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR:
(name, location, phone no.)
Roxana Lega, Trace Organics Section
Laboratory Services Branch
125 Resources Rd.
235-5756

SUPERVISOR: Yvonne Jones, Trace Organics Section, Lab. Services Br

OBJECTIVE(S): To provide a gas chromatographic analytical method for the analyses of a broad range of phenols, catechols, guaicols found in the Pulp and Paper Industry effluents.

PROJECT DESCRIPTION: Method consists of dual FID/EC method to simultaneously analyse chlorinated and non chlorinated speciated phenols. After a preliminary extractor and derivatization, the extracts are submitted to gas chromatography.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds: -Laboratory Services Branch -Federal Gov't.- UIC ( )*	Cost:				
	DOE ($000's):	10			10
	Salaries and Benefits ($000's) :	(8)* 3			(8)* 3
	Total ($000):	21			21
	Man years: (internal)	0.15			0.15

OUTPUT (papers, presentations, reports): Internal Report

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS: * A Section 38 Project

Date: April 26, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Routine method for Analysis of Resin and Fatty Acids for the Paper & Pulp Industry

PROJECT NO: TO-I-87-13
START DATE: (m/yr): March/87
RES. PRIORITY:

KEYWORDS: Resin Fatty Acids/Paper & Pulp MBR PROJECT CATEGORY: MBR 8c

RESEARCH CATEGORY: INTERNAL X or EXTERNAL ___
Solicited ___ Contract ___
Unsolicited ___ Grant ___

EXTERNAL PROJECTS
PRINCIPAL INVESTIGATOR
AND AFFILIATION:

LIAISON OFFICER:
(name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR: (name, location, phone no.)	Roxana Lega, Trace Organics Section Laboratory Services Branch 125 Resources Rd. 235-5756
SUPERVISOR:	Y. Jones, Trace Organics Sec., Lab. Ser. Br.

OBJECTIVE(S): To provide a routine method for the analysis of resin and fatty acids, targeting on the parameters required for MISA Paper and Pulp Industry.

PROJECT DESCRIPTION: A method provided by Dr. Voss from Paprican will be adjusted and developed to provide a routine method for the analysis of fatty and resin acids in MOE labs, using the presently available automated G.C. - auto samplers, tumblers etc. with the requested client detection limits.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds: -Laboratory Services Branch -Federal Gov't.- UIC ( )*	Cost:				
	DOE ($000's):	10			10
	Salaries and Benefits	(8)*			(8)*
	($000's) :	3			3
	Total ($000):	21			21
	Man years: (internal)	0.15			0.15

OUTPUT (papers, presentations, reports): Method will be published by the Analytical subgroup of the Technical Committee for the Pulp & Paper Industry.

EXTERNAL PARTICIPATION (ministries, governments, agencies):
Pulp and Paper Research Institute of Canada, Pointe Claire, Quebec
Environmental Protection Services, Burlington, Ontario

COMMENTS: * A Section 38 Project

Date: April 28, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Robotics for Dissolved Oxygen Measurement in the Biochemical Oxygen Demand Test (BOD Test)

PROJECT NO: WQ-I-87-01
START DATE: (m/yr):March, 1987
RES. PRIORITY:

KEYWORDS: Robotics, Oxygen, Measurement, BOD

MBR PROJECT CATEGORY: Several

RESEARCH CATEGORY: INTERNAL X or EXTERNAL ___
Solicited ___ Contract ___
Unsolicited ___ Grant ___

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:

LIAISON OFFICER: (name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR: (name, location, phone no.)	W. Wright, LSB Water Quality Section 235-5879	B. Cheung LSB Water Quality Section 235-5874
SUPERVISOR:	Peter Campbell,Supervisor Water Quality Section 235-5872	

OBJECTIVE(S): To automate the measurements of oxygen concentration required on the first and fifth day of the BOD test.

PROJECT DESCRIPTION: Purchase robotic hardware and software to enable unattended oxygen readings and data collection. Occasional attention will be required to change sample bottles in racks. The major difficulty is minimizing the time for each reading since more than 600 readings may be required per day.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds:	Cost:				
	DOE ($000's):	14			14
Laboratory Services Branch	Salaries and Benefits ($000's) :	7			7
	Total ($000):	21			21
	Man years: (internal)	0.2			0.2

OUTPUT (papers, presentations, reports): Internal method documentation on completion.

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

Date: April 28, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Robotics for Weight Measurement in the Solids Test
PROJECT NO: WQ-I-87-02
START DATE: (m/yr): March, 1987
RES. PRIORITY:

KEYWORDS: Robotics, Weight, Measurement, Solids
MBR PROJECT CATEGORY: ALL

RESEARCH CATEGORY: INTERNAL X or EXTERNAL
Solicited ___ Contract ___
Unsolicited ___ Grant ___

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:

LIAISON OFFICER: (name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR: (name, location, phone no.)
W. Wright, and J. Evans
Laboratory Services Branch
Water Quality Section
235-5879

SUPERVISOR:
P. Campbell, Supervisor
Water Quality Section
235-5872

OBJECTIVE(S): To automate the measurement of weights of filters and dishes containing dried residue from environmental samples. Initial tare weight measurement is also to be automated.

PROJECT DESCRIPTION: Purchase robotic hardware and software to enable unattended weighing on microbalance, and data collection. Occasional attention will be required to change racks of filters or dishes. The major difficulty is minimizing the time required for each reading, since more than 2,000 readings may be required per week.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds:	Cost:				
	DOE ($000's):	15	15		30
Laboratory Services Branch	Salaries and Benefits ($000's) :	10	7		17
	Total ($000):	25	22		47
	Man years: (internal)	0.3	0.2		0.5

OUTPUT (papers, presentations, reports): Internal method documentation on completion

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

Date: April 28, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Development of 15 Methods for Technicon TRAAC Colourimetric Systems.

PROJECT NO: WQ-I-87-03
START DATE: (m/yr): April, 1987
RES. PRIORITY:

KEYWORDS: TRAAC, Technicon, Colourimetric, Methods

MBR PROJECT CATEGORY: Several

RESEARCH CATEGORY: INTERNAL X or EXTERNAL ___
Solicited ___ Contract __
Unsolicited ___ Grant __

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:

LIAISON OFFICER: (name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR: (name, location, phone no.)
M. Rawlings, Supervisor
Laboratory Services Branch
Water Quality Section
235-5880

SUPERVISOR:
M. Rawlings, Supervisor
Water Quality Section
235-5880

OBJECTIVE(S): To develop 15 colourimetric methods using the latest hardware and state of the art techniques for continuous flow systems.

PROJECT DESCRIPTION: The reagent concentrations, time, and mixing parameters from the existing AutoAnalyzer II methods will be recalculated to suit the TRAACS 800 hydraulics. A suitable manifold will be built and tested. Several runs of samples over several days will be intercompared.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds:	Cost:				
	DOE ($000's):	25	25		50
Laboratory Services Branch	Salaries and Benefits ($000's) :	20	15		35
	Total ($000):	45	40		85
	Man years: (internal)	0.5	0.5		1

OUTPUT (papers, presentations, reports): Internal method documentation on completion, both HAMES and Bench, complete with revised Q.C. protocols.

EXTERNAL PARTICIPATION (ministries, governments, agencies): Technical advice will be available from Technicon International Canada Ltd.

COMMENTS: Not all required modules are available for the TRAACS 800 System as yet. Methods will be tackled as modules become available.

Date: April 28, 1987
Revision:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Robotics for Sub-aliquoting Station for Inorganic Tests.

PROJECT NO: WQ-I-87-04
START DATE: (m/yr):Sept. 1987
RES. PRIORITY:

KEYWORDS: Robotics, Aliquoting, Inorganic

MBR PROJECT CATEGORY: ALL

RESEARCH CATEGORY: INTERNAL X or EXTERNAL ___
Solicited ___ Contract ___
Unsolicited ___ Grant ___

EXTERNAL PROJECTS PRINCIPAL INVESTIGATOR AND AFFILIATION:

LIAISON OFFICER: (name, location, phone no.)

INTERNAL PROJECTS PRINCIPAL INVESTIGATOR: (name, location, phone no.)
W. Wright,
Laboratory Services Branch
Water Quality Section
235-5879

SUPERVISOR:
W. Wright,
Water Quality Section
235-5879

OBJECTIVE(S): To prepare multiple aliquots of samples which are suitable for Water Quality Section (WQS) work stations and which are accompanied by identifiers suitable for LIS operations.

PROJECT DESCRIPTION: Based on an initial feasibility study by an outside consultant, a design for a robotic station will be developed.

BUDGET AND RESOURCES:	Year:	1	2	3	Total
Source of funds:	Cost:				
	DOE ($000's):	50	50		100
Laboratory Services Branch	Salaries and Benefits ($000's) :	15	15		30
	Total ($000):	65	65		130
	Man years: (internal)	0.5			0.5

OUTPUT (papers, presentations, reports): Reports

EXTERNAL PARTICIPATION (ministries, governments, agencies):

COMMENTS:

ONTARIO PESTICIDES ADVISORY COMMITTEE PROJECTS

PROJECT NO.	TITLE	PAGE
OPAC87-01	Biological Control of the Root-Knot Nematode Meliodogyne Hapla in Economic Host Plants Using Nematode-Destroying Fungi	234
OPAC87-02	Assessment of Reduced Amounts of Herbicide Applied More Frequently to Orchard Crops	235
OPAC87-03	Biological Control of Sclerotinia sclerotiorum in Canola and White Beans	236
OPAC87-04	Biological Control of Dandelions in Turfgrass Swards	237
OPAC87-05	Development of an Effective Dissemination Procedure for the Snow-Mold-Control Agent Typhula phacorrhiza	238
OPAC87-06	The Hydrological Pathways of Herbicide Transport: Field Monitoring and Comparison of Application Techniques and Analysis of Herbicide Residues in Soil, Surface and Subsurface Waters	239
OPAC87-08	Effect of Flooding and Crop Rotation on Pathogens in Muck	240
OPAC87-09	Winter Survival and Economic Thresholds for Corn Rootworms in Field Corn	241
OPAC87-10	Field Test of New Corn Rootworm Pathogen	242
OPAC87-11	Effects of Post Spray Weather on the Foliage Life of B.t.	243
OPAC87-13	Improved Efficiency of Chemical Control of White Mold in Snap Bean	244
OPAC87-14	The Development of an IPM Module for the Control of Phytophagous Mites in Apple Orchards	245

PROJECT NO.	TITLE	PAGE
OPAC87-15	Effects of Microencapsulated and EC Permethrin and a New Generation Synthetic Pyrethroid SAN 811-I on Stream Invertebrates	246
OPAC87-16	Microbiol Biocontrol for Supressing Milkweed Feed Production, Using Yeasts to Curtail Fertilization	247
OPAC87-17	Developing an Implementation Protocol for Fruit-Set and Seed-Set of the Forest Wildflower Polygonatum pubescens in an Insect Monitoring System	248
OPAC87-18	Introduction of Holocothorax testaceipes (Hymenoptera Encyrtidae) for the Biological Control of Spotted Tentiform Leafminer, phyllomorycter blancardella (lepiodoptera: Gracillarlidae)	249
OPAC87-19	Assessment of Pre-Emergence Herbicides for Weed Control in Onions	250
OPAC87-20	Weather Timed Fungicide on Tomatoes for Improved Disease Control	251
OPAC87-21	Assessment of the Potential of Aleochara bilineata for the Control of Root Maggots in the Home Garden	252
OPAC87-22	Development of Sex Phermone Traps for Monitoring Jackpine Budworm	253
OPAC87-23	Threshold for Potato Leafhoppers on Potatoes in Ontario	254
OPAC87-24	A Barrier Trapping Technique for Control of Glischrochilus quadrisignatus and the Assessment of the Dispersal Behaviour of the Beetle Between Raspberry, Corn and Tomato Fields	255
OPAC87-25	Fate of Sulfonylurea Herbicides in Ontario	256

PROJECT NO.	TITLE	PAGE
OPAC87-26	Elimination of an Insecticide Resistent House Fly Population by Sanitation and Susceptible Fly Release	257
OPAC87-27	Biological Control of Strawberry and Raspberry Diseases	258
OPAC87-29	Effects of Processing on Permethrin Residues on Ontario Vegetables	259
OPAC87-30	Development of a Monoclonal Antibody Probe for Eggs and Larvae of the Parasite Pholetesor ornigis	260
OPAC87-31	The Role of Parasitoids in the Collapse of Jack Pine Budworm Populations	261
OPAC87-32	Study of Deposition of Airborne Contaminants in the Great Lakes Basin Using Lichens and Mosses	262

DATE: June 3/87
REVISION:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Biological control of the root-knot nematode Meliodogyne hapla in economic host plants using nematode-destroying fungi.

PROJECT NO: OPAC 87-01
START DATE: 3/87
RES. PRIORITY:

KEYWORDS: biocontrol, nematodes, soil fungi

MBR PROJECT CATEGORY:

RESEARCH CATEGORY: INTERNAL ____ OR EXTERNAL X
Solicited ____
Unsolicited X
Contract ____
Grant X

EXTERNAL PROJECTS:
PRINCIPAL INVESTIGATOR AND AFFILIATION: Dr. G.L. Barron
Dept. of Environmental Biology
University of Guelph, Guelph, Ontario
(519-824-4120)

LIAISON OFFICER:
(name, location, tel.no.) C.D. Fowle, OPAC

INTERNAL PROJECTS
PRINCIPAL INVESTIGATOR:
(name, location, tel.no.)

SUPERVISOR:

OBJECTIVE(S): To isolate nematode-destroying fungi from soils for experimental seed treatment.

PROJECT DESCRIPTION: Recover and identify nematode-destroying fungi associated with root-knot nematodes in Ontario soils; screen these fungi for growth sporulation and and production of resting structures i.e. suitability for seed treatment; select several of the most promising fungi and coat seeds of susceptible host plants, testing the fungi's ability to protect host plants against Meliodogyne lapla.

BUDGET AND RESOURCES:	YEAR:	①	2	3	4	5	6	TOTAL
EXTERNAL PROJECTS	Cost: ($000's)							
	Operating:	.9						0.9
	Salaries :	9.5						9.5
Budget	Total :	10.4						10.4
Source OPAC	**Man years:**	0.5						0.5
INTERNAL PROJECTS	Cost ($000's)							
	DOE :							
	Salaries :							
Budget	Total :							
Source:	**Man years:**							

OUTPUT (papers, presentations, reports): Presentation at annual OPAC Symposium

EXTERNAL PARTICIPATION (other ministries, agencies):

COMMENTS

Note: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget budget source by organization (e.g. RAC, OPAC, WRB, NBR, etc.

DATE: June 3/87
REVISION:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Assessment of reduced amounts of herbicide applied more frequently to orchard crops.

PROJECT NO: OPAC 87-02
START DATE: 3/87
RES. PRIORITY:

KEYWORDS: herbicide reduction, orchards

MBR PROJECT CATEGORY:

RESEARCH CATEGORY: INTERNAL ____ OR EXTERNAL _X_
Solicited ____
Unsolicited _X_
Contract ____
Grant _X_

EXTERNAL PROJECTS:
PRINCIPAL INVESTIGATOR AND AFFILIATION:
Mr. R.H. Brown
Ridgetown College of Agricultural Technology
Ridgetown, Ontario
(519-674-5456)

LIAISON OFFICER:
(name, location, tel.no.)
Dr. C.D. Fowle, OPAC

INTERNAL PROJECTS
PRINCIPAL INVESTIGATOR:
(name, location, tel.no.)

SUPERVISOR:

OBJECTIVE(S): To test lower rate of application of herbicides at varying frequencies to achieve reduced pesticide load and improved weed control.

PROJECT DESCRIPTION: Evaluate registered herbicides (linuron, terbacil, simazine, diuron, glyphosate) at recommended rates (one application) compared to reduced rates (multiple times) in orchards of applies, cherries, grapes and peaches for weed control. Also examine reduced rates of combination of herbicides for broad spectrum weed control.

BUDGET AND RESOURCES:	YEAR:	①	2	3	4	5	6	TOTAL
EXTERNAL	**Cost: ($000's)**							
PROJECTS	Operating:	.5						0.5
	Salaries :	4.5						4.5
Budget	Total :	5.0						5.0
Source OPAC	**Man years:**	0.3						0.3
INTERNAL	**Cost ($000's)**							
PROJECTS	DOE :							
	Salaries :							
Budget	Total :							
Source:	**Man years:**							

OUTPUT (papers, presentations, reports): Presentation at annual OPAC Symposium

EXTERNAL PARTICIPATION (other ministries, agencies):

COMMENTS

Note: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget budget source by organization (e.g. RAC, OPAC, WRB, MBR, etc.

DATE: June 3/87
REVISION:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Biological control of *Sclerotinia sclerotiorum* in canola and white beans

PROJECT NO: OPAC 87-03
START DATE: 3/87
RES. PRIORITY:

KEYWORDS: biocontrol, *sclerotinia*, canola, beans

MBR PROJECT CATEGORY:

RESEARCH CATEGORY: INTERNAL ____ OR EXTERNAL X
Solicited ____
Unsolicited X
Contract ____
Grant X

EXTERNAL PROJECTS:
PRINCIPAL INVESTIGATOR AND AFFILIATION: Dr. G.J. Boland
Dept. of Environmental Biology
University of Guelph
(519-824-4120)

LIAISON OFFICER:
(name, location, tel.no.) Dr. C.D. Fowle, OPAC

INTERNAL PROJECTS
PRINCIPAL INVESTIGATOR:
(name, location, tel.no.)

SUPERVISOR:

OBJECTIVE(S): Evaluate the potential for fungi isolated from canola and white bean flowers to prevent diseases caused by *Sclerotinia sclerotiorum*

PROJECT DESCRIPTION: Research conducted in 1985-86 established that 35 of 37 fungi isolated from canola and white bean flowers completely prevented disease in growth room conditions. Research conducted in 86/87 showed that the best candidates were 7 isolates from the genera *Alternaria*, *Cladosporium*, *Dreschlera*, *Fusarium*, *Gliocladium* and *Myrothecium*. In this, the second year of OPAC funding, the isolates will be tested under field trials, where the effect of antagonists, alone and in combination with a selective fungicidal application can be determined.

BUDGET AND RESOURCES:	YEAR:	1 86-01	②	3	4	5	6	TOTAL
EXTERNAL PROJECTS	**Cost: ($000's)**							
	Operating:	.75	1.5					2.25
	Salaries :	8.40	13.0					21.4
Budget	Total :	9.15	14.5					23.65
Source OPAC	**Man years:**	.4	0.835					1.235
INTERNAL PROJECTS	**Cost ($000's)**							
	DOE :							
	Salaries :							
Budget	Total :							
Source:	**Man years:**							

OUTPUT (papers, presentations, reports): Presentation at annual OPAC Symposium

EXTERNAL PARTICIPATION (other ministries, agencies):

COMMENTS

Note: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget budget source by organization (e.g. RAC, OPAC, WRB, MBR, etc.

DATE: June 3/87
REVISION:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Biological control of Dandelions in Turfgrass Swards.

PROJECT NO: OPAC 87-04
START DATE: 3/87
RES. PRIORITY:

KEYWORDS: Biocontrol, dandelions, turfgrass

MBR PROJECT CATEGORY: -

RESEARCH CATEGORY: INTERNAL ____ OR EXTERNAL X
Solicited ____
Unsolicited X
Contract ____
Grant X

EXTERNAL PROJECTS:
PRINCIPAL INVESTIGATOR AND AFFILIATION:
Dr. L.L. Burpee
Dept. of Environmental Biology
University of Guelph, Guelph, Ontario
(519-824-4120)

LIAISON OFFICER: (name, location, tel.no.) C.D. Fowle, OPAC

INTERNAL PROJECTS
PRINCIPAL INVESTIGATOR: (name, location, tel.no.)

SUPERVISOR:

OBJECTIVE(S): To complete field observations and data analysis from 86/87; to complete an evaluation of virulence and agressiveness of fungal isolates; to develop an improved method of innoculating dandelions and evaluate same under field conditions.

PROJECT DESCRIPTION: Research conducted in 86-87 showed that pathogenic fungi can be used to produce foliar necrosis of dandelions in controlled environment and in the field, however tap roots remained undamaged. Research in this second year of funding will develop and assess improved innoculation techniques that would result in better dandelion mortality.

BUDGET AND RESOURCES:	YEAR:	1 (86-02)	[✓ 2]	3	4	5	6	TOTAL
EXTERNAL PROJECTS	**Cost: ($000's)**							
	Operating:	0.636	0.2					.836
	Salaries :	8.4	6.8					15.2
Budget	Total :	9.036	7.0					16.036
Source OPAC	**Man years:**	0.8	0.8					1.6
INTERNAL PROJECTS	**Cost ($000's)**							
	DOE :							
	Salaries :							
Budget	Total :							
Source:	**Man years:**							

OUTPUT (papers, presentations, reports): Presentation at annual OPAC Symposium

EXTERNAL PARTICIPATION (other ministries, agencies):

COMMENTS

Note: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget budget source by organization (e.g. RAC, OPAC, WRB, NBR, etc.

DATE: June 3/87
REVISION:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Development of an effective dissemination procedure for the snow-mold-control agent Typhula phacorrhiza.

PROJECT NO: OPAC 87-05
START DATE: 3/87
RES. PRIORITY:

KEYWORDS: Biocontrol, snow mold, turfgrass

MBR PROJECT CATEGORY:

RESEARCH CATEGORY: INTERNAL ____ OR EXTERNAL X

Solicited ____
Unsolicited X
Contract ____
Grant X

EXTERNAL PROJECTS:
PRINCIPAL INVESTIGATOR AND AFFILIATION:
Dr. L.L. Burpee
Dept. of Environmental Biology
University of Guelph
(519-824-4120)

LIAISON OFFICER:
(name, location, tel.no.) C.D. Fowle, OPAC

INTERNAL PROJECTS
PRINCIPAL INVESTIGATOR:
(name, location, tel.no.)

SUPERVISOR:

OBJECTIVE(S): To complete evaluation of storage technique for inoculum and to improve application techniques.

PROJECT DESCRIPTION: Grey snow mold Typhula ishikariensis is a serious problem on golf courses and sod farms. This research (2nd year of funding) is to investigate ways to apply Typhula phacorrhiza (in pellets) to turfgrass with would suppress development of the grey snow mold fungi. Research in 86-87 provided information on suitable bulking agents for pellet formulations.

BUDGET AND RESOURCES:	YEAR:	1 (86-29)	②	3	4	5	6	TOTAL
EXTERNAL PROJECTS	Cost: ($000's)							
	Operating:	.555	-					0.555
	Salaries :	9.8	10.0					19.8
Budget	Total :	10.355	10.00					10.355
Source OPAC	**Man years:**	.48	.7					1.17
INTERNAL PROJECTS	Cost ($000's)							
	DOE :							
	Salaries :							
Budget	Total :							
Source:	**Man years:**							

OUTPUT (papers, presentations, reports): Presentation at annual OPAC Symposium

EXTERNAL PARTICIPATION (other ministries, agencies):

COMMENTS

Note: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget budget source by organization (e.g. RAC, OPAC, WRB, MBR, etc.

DATE: June 5, 1987
REVISION:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: The hydrological pathways of herbicide transport: field monitoring and comparison of application techniques and analysis of herbicide residues in soil, surface and subsurface waters.

PROJECT NO: OPAC 87-06
START DATE: (m/yr): 3/87
RES. PRIORITY:

KEYWORDS: metolachlor, residues, field dissipation

MBR PROJECT CATEGORY:

RESEARCH CATEGORY: INTERNAL ____ OR EXTERNAL X
Solicited ____
Unsolicited X
Contract ____
Grant X

EXTERNAL PROJECTS:
PRINCIPAL INVESTIGATOR AND AFFILIATION:
Dr. J. M. Buttle
Geography Department
Trent University
Peterborough (705-748-1475)

LIAISON OFFICER:
(name, location, tel.no.)
Dr. C. D. Fowle, OPAC

INTERNAL PROJECTS
PRINCIPAL INVESTIGATOR:
(name, location, tel.no.)

SUPERVISOR:

OBJECTIVE(S): Examine total loading of metolachlor into receiving waters, comparing ppi treatment to pre-emerge treatment in corn at field site near Bailieboro; using improved field methology quantify pathways of movement. Work to augment research conducted in 1986.

PROJECT DESCRIPTION: A field site will be planted in corn and treated with 2.75 L/ha Dual (metolachlor) late May 1987. Soil samples will be taken at saturated footslope zone and upslope areas one hour and 1,2,3,4,6,8,10,12,16,24 and 52 weeks after application. Ground water flow, Hortonian overland flow and saturation overland flow measurements will be taken. Total herbicide and sediment losses will be calculated and compared for the two farming practices.

BUDGET AND RESOURCES:	YEAR:	1 (85-29)	②	3	4	5	6	TOTAL
EXTERNAL PROJECTS	Cost: ($000's)							
	Operating:	18.85	15.0					33.85
	Salaries :	11.2	14.0					25.2
Budget	Total :	30.05*	29.000	**				59.05
Source OPAC	**Man years:**	1.2	1.1					2.3
INTERNAL PROJECTS	Cost ($000's)	* 16.05 execution 14.0 analysis						
	DOE :	** 15,000 execution 14.000 analysis						
	Salaries :							
Budget	Total :							
Source:	**Man years:**							

OUTPUT (papers, presentations, reports):

Presentation at annual OPAC symposium.

EXTERNAL PARTICIPATION (other ministries, agencies):

COMMENTS

Note: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget budget source by organization (e.g. RAC, OPAC, WRB, NBR, etc.

DATE: June 5, 1987
REVISION:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Effect of flooding and crop rotation on pathogens in muck.

PROJECT NO: OPAC 87-08
START DATE: (m/yr): 3/87
RES. PRIORITY:

KEYWORDS: flooding, crop rotation, white mold, nematodes, onion white rot

MBR PROJECT CATEGORY:

RESEARCH CATEGORY: INTERNAL ____ OR EXTERNAL X
Solicited ____
Unsolicited X
Contract ____
Grant X

EXTERNAL PROJECTS:
PRINCIPAL INVESTIGATOR AND AFFILIATION: Dr. L. V. Edgington
Department of Environmental Biology
University of Guelph
(519-824-4120)

LIAISON OFFICER:
(name, location, tel.no.) Dr. C. D. Fowle, OPAC

INTERNAL PROJECTS
PRINCIPAL INVESTIGATOR:
(name, location, tel.no.)

SUPERVISOR:

OBJECTIVE(S): To test the effects of flooding on the control of fungal diseases on muck soil crops (onions white rot, white mold, nematodes).

PROJECT DESCRIPTION: Previous research has shown control of onion white rot cannot be controlled by any one method. Research this summer is to determine the effect of flooding alone and in combination with crop rotation on three pathogens : onion white rot, sclerotinia white mold, and nematodes in plots at the Bradford Muck Research Station.

BUDGET AND RESOURCES:	YEAR:	1 (84-24)	2 (85-02)	3 (86-26)	④	5	6	TOTAL
EXTERNAL PROJECTS	Cost: ($000's)							
	Operating:				1.5			
	Salaries :				13.5			
Budget	Total :	8.6	10.1	11.0	15.0			44.7
Source OPAC	**Man years:**				1.0			
INTERNAL PROJECTS	Cost ($000's)							
	DOE :							
	Salaries :							
Budget	Total :							
Source:	**Man years:**							

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (other ministries, agencies):

COMMENTS

Note: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget budget source by organization (e.g. RAC, OPAC, WRB, NBR, etc.

DATE: June 5, 1987
REVISION:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Winter survival and economic thresholds for corn rootworms in field corn.

PROJECT NO: OPAC 87-09
START DATE: (m/yr): 3/87
RES. PRIORITY:

KEYWORDS: economic threshold, corn rootworm, overwinter mortality

MBR PROJECT CATEGORY: -

RESEARCH CATEGORY: INTERNAL ____ OR EXTERNAL X
Solicited ____
Unsolicited X
Contract ____
Grant X

EXTERNAL PROJECTS:
PRINCIPAL INVESTIGATOR AND AFFILIATION: Dr. C. R. Ellis
Department of Environmental Biology
University of Guelph.
(519-824-4120)

LIAISON OFFICER: (name, location, tel.no.) Dr. C. D. Fowle, OPAC

INTERNAL PROJECTS
PRINCIPAL INVESTIGATOR: (name, location, tel.no.)

SUPERVISOR:

OBJECTIVE(S): To determine the over-winter survival of root worm eggs; to determine determine the relationship between late fall populations of beetles and damage to corn in the year following.

PROJECT DESCRIPTION: Previous research has developed information on corn rootworm monitoring methods and economic thresholds. Current work is to extend the application of previous research to i) define maximum population that causes no damage the following year with greater confidence and ii) determine the significanc factors causing winter mortality and the practicality of improving IPM in corn through predicting or monitoring winter mortality.

BUDGET AND RESOURCES:	YEAR:	1 (84-04)	2 (85-03)	3 (86-04)	④	5	6	TOTAL
EXTERNAL PROJECTS	**Cost: ($000's)**							
	Operating:							
	Salaries :							
Budget	Total :	15.0	18.19	17.64	18.6			69.43
Source OPAC	**Man years:**							
INTERNAL PROJECTS	**Cost ($000's)**							
	DOE :							
	Salaries :							
Budget	Total :							
Source:	**Man years:**							

OUTPUT (papers, presentations, reports):

Presentation at annual OPAC symposium.

EXTERNAL PARTICIPATION (other ministries, agencies):

COMMENTS

Note: **"External" refers to projects carried out by investigators outside the Ministry. Please indicate budget budget source by organization (e.g. RAC, OPAC, WRB, NBR, etc.**

DATE: June 5/87
REVISION:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Field test of new corn rootworm pathogen

PROJECT NO: OPAC 87-10
START DATE: 3/87
RES. PRIORITY:

KEYWORDS: biocontrol, corn rootworm

MBR PROJECT CATEGORY:

RESEARCH CATEGORY: INTERNAL ____ OR EXTERNAL X
Solicited ____
Unsolicited X
Contract ____
Grant X

EXTERNAL PROJECTS:
PRINCIPAL INVESTIGATOR AND AFFILIATION: Dr. Philip Fitz-James
Dept. of Microbiology and Biochemistry
University of Western Ontario, London, Ontario

LIAISON OFFICER: (name, location, tel.no.) Dr. C.D. Fowle, OPAC

INTERNAL PROJECTS
PRINCIPAL INVESTIGATOR: (name, location, tel.no.)

SUPERVISOR:

OBJECTIVE(S): To determine minimal concentration of cultures of Bacillus laterosporus to achieve rootworm control.

PROJECT DESCRIPTION: A subspecies of B. laterosporus has been subject to greenhouse tests against western corn rootworm Diabrotica vergifera: there tests indicate a marked protective action of the culture against 1st instar larvae of Diabrotica at a level of about 10^9 spores per metre of row or 10^7 spores per cubic cm of soil. Current research proposes to conduct field tests in sweet corn and OH10 43 feed corn with different concentrations and components of the culture.

BUDGET AND RESOURCES:	YEAR:	①	2	3	4	5	6	TOTAL
EXTERNAL PROJECTS	Cost: ($000's)							
	Operating:	1.1						1.1
	Salaries :	4.9						4.9
Budget	Total :	6.0						6.0
Source OPAC	**Man years:**	.36						.36
INTERNAL PROJECTS	Cost ($000's)							
	DOE :							
	Salaries :							
Budget	Total :							
Source:	**Man years:**							

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (other ministries, agencies): Presentation at annual OPAC Symposium.

COMMENTS

Note: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget budget source by organization (e.g. RAC, OPAC, WRB, NBR, etc.

DATE: June 5/87
REVISION:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Effects of post spray weather on the foliage life of B.t.

PROJECT NO: OPAC 87-11
START DATE: 3/87
RES. PRIORITY:

KEYWORDS: Bacillus thuringiensis, weathering influences, residual toxicity, spruce budworm

MBR PROJECT CATEGORY: -

RESEARCH CATEGORY: INTERNAL ____ OR EXTERNAL X
Solicited ____
Unsolicited X
Contract ____
Grant X

EXTERNAL PROJECTS:
PRINCIPAL INVESTIGATOR AND AFFILIATION: Dr. Kees van Frankenhuyen
Sault College of Applied Arts and Technology
Sault Ste. Marie (705-949-9461)

LIAISON OFFICER: (name, location, tel.no.) Dr. C.D. Fowle, OPAC

INTERNAL PROJECTS
PRINCIPAL INVESTIGATOR: (name, location, tel.no.)

SUPERVISOR:

OBJECTIVE(S): To assess the post spray life of B.t. in relation to weather and to test the effectiveness of protective adjuvants.

PROJECT DESCRIPTION: Balsam fir seedlings with freshly flushed buds will be sprayed in a spray chamber, mimicing aerial application. Seedlings will be placed outside and residual toxicity of B.t. will be monitored by frequent bioassay. Comparison will be made on effects of full sun and rain, shade and rain, shade and no rain. Formulation of oil base and water base will be tested with and without sticker adjuvants.

BUDGET AND RESOURCES:	YEAR:	1 (86-05)	②	3	4	5	6	TOTAL
EXTERNAL PROJECTS	**Cost: ($000's)**							
	Operating:	5.508	1.3					6.808
	Salaries :	6.75	10.6					17.35
Budget	Total :	2.258	11.9					14.158
Source OPAC	**Man years:**	0.5	0.5					1.0
INTERNAL PROJECTS	**Cost ($000's)**							
	DOE :							
	Salaries :							
Budget	Total :							
Source:	**Man years:**							

OUTPUT (papers, presentations, reports): Presentation at annual OPAC Symposium

EXTERNAL PARTICIPATION (other ministries, agencies):

COMMENTS

Note: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget budget source by organization (e.g. RAC, OPAC, WRB, NBR, etc.

DATE: June 5/87
REVISION:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Improved efficacy of chemical control of white mold in snap bean.

PROJECT NO: OPAC 87-13
START DATE: 3/87
RES. PRIORITY:

KEYWORDS: snapbeans, Sclerotinia sclerotiorum, predictive model.

MBR PROJECT CATEGORY:

RESEARCH CATEGORY: INTERNAL ____ OR EXTERNAL X
Solicited ____ Contract ____
Unsolicited X Grant X

EXTERNAL PROJECTS:
PRINCIPAL INVESTIGATOR AND AFFILIATION: Dr. Robert Hall
Dept. of Environmental Biology
University of Guelph, Guelph, Ontario
(519-824-4120)

LIAISON OFFICER:
(name, location, tel.no.) Dr. C.D. Fowle, OPAC

INTERNAL PROJECTS
PRINCIPAL INVESTIGATOR:
(name, location, tel.no.)

SUPERVISOR:

OBJECTIVE(S): To test the utility of a predictive model for fungal infection in snap beans and to test the efficacy of spray applications as recommended by the model.

PROJECT DESCRIPTION: A predictive model currently exists to predict severe white mold infections in white beans. Current research is to adapt this model to snap beans to being sufficiently sensitive to predict yield limiting levels of the disease (< 2% pods infected) in snap beans. Pathogen, crop and environmental factors will be monitored in relation to the development of white mold in snap beans and the effectiveness of fungicide sprays applied according to the model will be tested.

BUDGET AND RESOURCES:	YEAR:	①	2	3	4	5	6	TOTAL
EXTERNAL PROJECTS Budget Source OPAC	**Cost: ($000's)** Operating: Salaries : Total : **Man years:**	 3.0 7.0 10.0 .5						 3.0 7.0 10.0 .5
INTERNAL PROJECTS Budget Source:	**Cost ($000's)** DOE : Salaries : Total : **Man years:**							

OUTPUT (papers, presentations, reports): Presentation at annual OPAC Symposium

EXTERNAL PARTICIPATION (other ministries, agencies):

COMMENTS

Note: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget budget source by organization (e.g. RAC, OPAC, WRB, MBR, etc.

DATE: June 5/87
REVISION:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: The development of an IPM module for the control of phytophagous mites in apple orchards.

PROJECT NO: OPAC 87-14
START DATE: 3/87
RES. PRIORITY: -

KEYWORDS: phytophagous mites, apples, predictive model

MBR PROJECT CATEGORY:

RESEARCH CATEGORY: INTERNAL ____ OR EXTERNAL X
Solicited ____
Unsolicited X
Contract ____
Grant X

EXTERNAL PROJECTS:
PRINCIPAL INVESTIGATOR AND AFFILIATION: Dr. Rudolf Harmsen
Biology Department
Queen's University, Kingston, Ontario
(613-547-3072)

LIAISON OFFICER:
(name, location, tel.no.) Dr. C.D. Fowle, OPAC

INTERNAL PROJECTS
PRINCIPAL INVESTIGATOR:
(name, location, tel.no.)

SUPERVISOR:

OBJECTIVE(S): To test the reliability of the model in the presence of insecticides

PROJECT DESCRIPTION: Previous research has resulted in a TPTP model for 2 taxa: spider mites (P. ulmi; T. urticae) and rust mites (A. schlechtendali) and two predatory taxa: the stigmaeids and the phytoseiids. The model appears capable of predicting the likelihood of pestiferous mite populations exceeding economic thresholds. Field trial at Smithfield in 1986 failed to accurately predict mite populations as the model could not take into account effects of pesticide application on mites. Current field research will lead to modification of the model. Work to continue in 1988.

BUDGET AND RESOURCES:	YEAR:	①	2	3	4	5	6	TOTAL
EXTERNAL PROJECTS	**Cost: ($000's)**							
	Operating:	1.5						1.5
	Salaries :	3.5						3.5
Budget	Total :	5.0						5.0
Source OPAC	**Man years:**	Other funds ($10,000) from Queen's and Ag. Canada support this project.						
INTERNAL PROJECTS	**Cost ($000's)**							
	DOE :							
	Salaries :							
Budget	Total :							
Source:	**Man years:**							

OUTPUT (papers, presentations, reports): Presentation at annual OPAC Symposium

EXTERNAL PARTICIPATION (other ministries, agencies):

COMMENTS

Note: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget budget source by organization (e.g. RAC, OPAC, WRB, MBR, etc.

DATE: June 5/87
REVISION:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Effects of microencapsulated and EC permethrin and a new generation synthetic pyrethroid SAN 811-I on stream invertebrates

PROJECT NO: OPAC 87-15
START DATE: 3/87
RES. PRIORITY:

KEYWORDS: permethrin, aquatic invertebrates, constant flow field bioassay.

MBR PROJECT CATEGORY:

RESEARCH CATEGORY: INTERNAL ____ OR EXTERNAL X
Solicited ____
Unsolicited X
Contract ____
Grant X

EXTERNAL PROJECTS:
PRINCIPAL INVESTIGATOR AND AFFILIATION: Dr. N.K. Kaushik
Dept. of Environmental Biology
University of Guelph, Guelph, Ontario

LIAISON OFFICER: (name, location, tel.no.) Dr. C.D. Fowle, OPAC

INTERNAL PROJECTS
PRINCIPAL INVESTIGATOR: (name, location, tel.no.)

SUPERVISOR:

OBJECTIVE(S): To assess the effect of micro-encapsulation on the toxicity of permethrin to aquatic invertebrates; and to determine EC_{50} and EC_{90} for new synthetic pyrethroid SAN 811-I.

PROJECT DESCRIPTION: Field bioassays will be carried out at a suitable stream near Guelph. Selected invertebrates (Plecoptera, Ephemeroptera, Trichoptera, Diptera and and Amphipoda) and black fly larvae will be exposed to a stream containing toxicant in vinyl eavestrough; values for EC_{50} and EC_{90} will be determined by probit analysis. Capsules will be partitioned by size prior to bioassay to help determine capsule size/toxicity relationships.

BUDGET AND RESOURCES:	YEAR:	①	2	3	4	5	6	TOTAL
EXTERNAL PROJECTS	Cost: ($000's)							
	Operating:	4.5						4.5
	Salaries :	9.0						9.0
Budget	Total :	13.5						13.5
Source OPAC	**Man years:**	1.0						1.0
INTERNAL PROJECTS	Cost ($000's)							
	DOE :							
	Salaries :							
Budget	Total :							
Source:	**Man years:**							

OUTPUT (papers, presentations, reports): Presentation at annual Symposium

EXTERNAL PARTICIPATION (other ministries, agencies):

COMMENTS

Note: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget budget source by organization (e.g. RAC, OPAC, [illegible], [illegible], etc.

DATE: June 5/87
REVISION:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Microbiol biocontrol for suppressing milkweed feed production, using yeasts to curtail fertilization

PROJECT NO: OPAC 87-16
START DATE: 3/87
RES. PRIORITY:

KEYWORDS: biocontrol, milkweed, fertility, reduction by yeasts

MBR PROJECT CATEGORY:

RESEARCH CATEGORY: INTERNAL ____ OR EXTERNAL X
Solicited ____
Unsolicited X
Contract ____
Grant X

EXTERNAL PROJECTS:
PRINCIPAL INVESTIGATOR AND AFFILIATION: Dr. G. Kevan
Dept. of Environmental Biology
University of Guelph
(519-824-4120)

LIAISON OFFICER:
(name, location, tel.no.) Dr. C.D. Fowle, OPAC

INTERNAL PROJECTS
PRINCIPAL INVESTIGATOR:
(name, location, tel.no.)

SUPERVISOR:

OBJECTIVE(S): To follow up on previous research to test the efficacy of yeasts in preventing fertilization.

PROJECT DESCRIPTION: The yeast, Metschnikowia reukaufii's presence in the nectar of common milkweed (Asclepias syriaca) highly correlates with failure of pollen germination. Current research proposes to gear up for rigorous experimentation on known biotypes of yeasts and milkweed in 1988: establish known biotypes of yeast and milkweed in the greenhouse and field; test known yeast cultures under highly controlled conditions of pollination; bioassay for virulent strains of M. reukautic; propagate milkweed clones.

BUDGET AND RESOURCES:	YEAR:	1 (86-08)	2	3	4	5	6	TOTAL
EXTERNAL PROJECTS	Cost: ($000's)							
	Operating:	7.45	5.0					12.45
	Salaries :	7.6	2.6					10.2
Budget	Total :	15.05	7.6					15.65
Source OPAC	**Man years:**	1.45	0.4					1.85
INTERNAL PROJECTS	Cost ($000's)							
	DOE :							
	Salaries :							
Budget	Total :							
Source:	**Man years:**							

OUTPUT (papers, presentations, reports): Presentation at annual OPAC Symposium

EXTERNAL PARTICIPATION (other ministries, agencies):

COMMENTS

Note: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget budget source by organization (e.g. RAC, OPAC, WRB, NBR, etc.

DATE: June 5/87
REVISION:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Developing an implementation protocol for fruit-set and seed-set of the forest wildflower Polygonatum pubescens in an insect monitoring system.

PROJECT NO: OPAC 87-17
START DATE: 3/87
RES. PRIORITY:

KEYWORDS: biological indicator, hairy Solomon's Seal, forest wild flower.

MBR PROJECT CATEGORY:

RESEARCH CATEGORY: INTERNAL ____ OR EXTERNAL X
Solicited ____
Unsolicited X
Contract ____
Grant X

EXTERNAL PROJECTS:
PRINCIPAL INVESTIGATOR AND AFFILIATION: Dr. P.D. Kingsbury
Sault College of Applied Arts and Technology
Sault Ste. Marie
(705-949-9461)

LIAISON OFFICER: (name, location, tel.no.) Dr. C.D. Fowle, OPAC

INTERNAL PROJECTS
PRINCIPAL INVESTIGATOR: (name, location, tel.no.)

SUPERVISOR:

OBJECTIVE(S): P. pubescens (hairy Solomon's Seal) has been identified as a suitable species for assessing impact of spraying on pollination and fruit-set. Its value as a monitor will be further tested.

PROJECT DESCRIPTION: P. pubescens on dependence on pollinators and relative self-incompatibility will be verified; investigation will be made of the relative role of presumed pollinators in the pollination of P. pubescens and observations made in field on the relative contribution of each pollinator to supplement previous research.

BUDGET AND RESOURCES:	YEAR:	1 (86-09)	②	3	4	5	6	TOTAL
EXTERNAL PROJECTS	Cost: ($000's)							
	Operating:	1.0	1.0					2.0
	Salaries :	9.6	11.5					21.1
Budget	Total :	10.6	12.5					23.1
Source OPAC	**Man years:**	0.6	0.6					1.2
INTERNAL PROJECTS	Cost ($000's)							
	DOE :							
	Salaries :							
Budget	Total :							
Source:	**Man years:**							

OUTPUT (papers, presentations, reports): Presentation at annual OPAC Symposium

EXTERNAL PARTICIPATION (other ministries, agencies):

COMMENTS

Note: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget budget source by organization (e.g. RAC, OPAC, WRB, MBR, etc.

DATE: OPAC 87-18
REVISION:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Introduction of Holcothorax testaceipes (Hymenoptera: Encyrtidae) for the biological control of spotted tentiform leafminer, Phyllonorycter blancardella (Lepidoptera: Gracillarlidae)

PROJECT NO: OPAC 87-18
START DATE: 3/87
RES. PRIORITY:

KEYWORDS: Biocontrol, tentiform leafminer

MBR PROJECT CATEGORY:

RESEARCH CATEGORY: INTERNAL ____ OR EXTERNAL X
Solicited ____ Contract ____
Unsolicited X Grant X

EXTERNAL PROJECTS:
PRINCIPAL INVESTIGATOR AND AFFILIATION: Dr. J.E. Laing
Dept. of Environmental Biology
University of Guelph, Guelph, Ontario
(519-824-4120)

LIAISON OFFICER: (name, location, tel.no.) Dr. C.D. Fowle, OPAC

INTERNAL PROJECTS
PRINCIPAL INVESTIGATOR: (name, location, tel.no.)

SUPERVISOR:

OBJECTIVE(S): To continue experimental releases of the parasite and evaluate its effectiveness and tolerance to pesticides.

PROJECT DESCRIPTION: The spotted tentiform leafminer (P. blancardella) is one of the most serious pests of apples in Eastern North America. The object of current research is to establish H. testaceipes (imported from Japan) in apple orchards in Ontario, determine if this parasite is tolerant to synthetic pyrethroids, evaluate the effectiveness of this parasite controlling the leaf miner.

BUDGET AND RESOURCES:	YEAR:	1 (85-08)	2 (86-10)	③	4	5	6	TOTAL
EXTERNAL	**Cost: ($000's)**							
PROJECTS	Operating:	1.047	1.68	1.1				3.827
	Salaries :	4.0	13.16	6.75				23.91
Budget	Total :	5.047	14.84	7.85				27.737
Source OPAC	**Man years:**	.8	.8	.75				2.35
INTERNAL	**Cost ($000's)**							
PROJECTS	DOE :							
	Salaries :							
Budget	Total :							
Source:	**Man years:**							

OUTPUT (papers, presentations, reports): Presentation at annual OPAC Symposium

EXTERNAL PARTICIPATION (other ministries, agencies):

COMMENTS

Note: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget budget source by organization (e.g. RAC, OPAC, WRB, MBR, etc.

DATE: June 5, 1987
REVISION:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Assessment of pre-emergence herbicides for weed control in onions.

PROJECT NO: OPAC 87-19
START DATE: 9m/yr): 3/87
RES. PRIORITY:

KEYWORDS: onions, herbicides, metolachlor, oxydiazon, oxfluorfen, chlorpropham

MBR PROJECT CATEGORY:

RESEARCH CATEGORY: INTERNAL ____ OR EXTERNAL X
Solicited ____
Unsolicited X
Contract ____
Grant X

EXTERNAL PROJECTS:
PRINCIPAL INVESTIGATOR AND AFFILIATION:
Dr. V. Souza Machado
Department of Horticultural Science
University of Guelph
(519-824-4120)

LIAISON OFFICER:
(name, location, tel.no.)
Dr. C. D. Fowle, OPAC

INTERNAL PROJECTS
PRINCIPAL INVESTIGATOR:
(name, location, tel.no.)

SUPERVISOR:

OBJECTIVE(S): To continue evaluation of herbicides for onions.

PROJECT DESCRIPTION: Five years research was devoted to examining alternatives to allidochlor in onions. This current year (final) is to continue examining pre-emergence herbicides for weed control in onions; the crop is so sensitive that it has been difficult to find an effective one. Products under examination are metolachlor (Dual) oxydiazon (Ronstar), oxyfluorfen (Goal) and chlorpropham (CIPC).

BUDGET AND RESOURCES:	YEAR:	1 (82-25)	2 (83-10)	3 (84-18)	4 (85-16)	5 (86-11)	⑥	TOTAL
EXTERNAL PROJECTS	Cost: ($000's)							
	Operating:	-	-	-	-	-	.5	0.5
	Salaries :	6.0	7.0	8.0	10.0	8.0	7.5	46.5
Budget	Total :	6.0	7.0	8.0	10.0	8.0	8.0	47.0
Source OPAC	**Man years:**	0.5	0.6	0.6	0.6	0.6	0.6	3.5
INTERNAL PROJECTS	Cost ($000's)							
	DOE :							
	Salaries :							
Budget	Total :							
Source:	**Man years:**							

OUTPUT (papers, presentations, reports):
Presentation at annual OPAC symposium.

EXTERNAL PARTICIPATION (other ministries, agencies):

COMMENTS

Note: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget budget source by organization (e.g. RAC, OPAC, WRB, MBR, etc.

DATE: June 5, 1987
REVISION:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Weather timed fungicide on tomatoes for improved disease control.

PROJECT NO: OPAC 87-20
START DATE: (m/yr): 3/87
RES. PRIORITY:

KEYWORDS: tomatoes, weather-timed fungicide sprays

MBR PROJECT CATEGORY:

RESEARCH CATEGORY: INTERNAL ____ OR EXTERNAL X
Solicited ____
Unsolicited X
Contract ____
Grant X

EXTERNAL PROJECTS:
PRINCIPAL INVESTIGATOR AND AFFILIATION:
Mr. S. R. Mackey, et al
Agriculture Research Department
H. J. Heinz Company of Canada
Leamington, Ontario (519-326-5701)

LIAISON OFFICER: (name, location, tel.no.) Dr. C. D. Fowle, OPAC

INTERNAL PROJECTS
PRINCIPAL INVESTIGATOR: (name, location, tel.no.)

SUPERVISOR:

OBJECTIVE(S): To develop cost-efficient spray program for the control of tomato diseases.

PROJECT DESCRIPTION: This year's objective is to develop a least-cost commercial spray program for control of tomato fungal diseases : at 12 commercial farms within 3 general areas - Harrow West, Harrow East and Leamington North, half the plots (2-4 hectares each) will be sprayed according to Pub. 363 and half sprayed according to disease severity values (DSV) with captafol or chlorothalanil. DSV's are determined by leaf wetness and temperature readings.

BUDGET AND RESOURCES:	YEAR:	1 (84-08)	2 (85-09)	3 (86-12)	④	5	6	TOTAL
EXTERNAL	Cost: ($000's)							
PROJECTS	Operating:	3.03	2.6	2.76	1.7			10.09
	Salaries :	4.97	5.4	10.88	9.6			30.85
Budget	Total :	8.0	8.0	13.64	11.3			40.94
Source OPAC	**Man years:**	0.63	.43	0.65	0.65			2.36
INTERNAL	Cost ($000's)							
PROJECTS	DOE :							
	Salaries :							
Budget	Total :							
Source:	**Man years:**							

OUTPUT (papers, presentations, reports):

Presentation at annual OPAC symposium.

EXTERNAL PARTICIPATION (other ministries, agencies):

COMMENTS

Note: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget budget source by organization (e.g. RAC, OPAC, WRB, NBR, etc.

DATE: June 5/87
REVISION: 3/87

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Assessment of the potential of Aleochara bilineata for the control of root maggots in the home garden.

PROJECT NO: OPAC 87-21
START DATE: 3/87
RES. PRIORITY:

KEYWORDS: biocontrol, home garden, root maggots, Aleochara bilineata

MBR PROJECT CATEGORY:

RESEARCH CATEGORY: INTERNAL ____ OR EXTERNAL X
Solicited ____
Unsolicited X
Contract ____
Grant X

EXTERNAL PROJECTS:
PRINCIPAL INVESTIGATOR AND AFFILIATION: Dr. D.G.R. McLeod
c/o University of Western Ontario
London, Ontario (519-679-4452)

LIAISON OFFICER: (name, location, tel.no.) C.D. Fowle, OPAC

INTERNAL PROJECTS
PRINCIPAL INVESTIGATOR: (name, location, tel.no.)

SUPERVISOR:

OBJECTIVE(S): To assess the effectiveness of an insect predator for control of root maggot in home gardens; and estimate the relative abundance of parasites and predators in the home garden environment.

PROJECT DESCRIPTION: Both the onion maggot and cabbage maggot may be controlled by Aleochara bilineata; reliable rearing techniques are available for this parasitiod/predator. The London Horticultural Society has agreed to locate a number of home gardens for study. A. bilineata will be released in Group A gardens beginning April 28; Group B will be control; Group C will be monitored for parasites, predators and root maggots. A station will also be set up at Pack's Lane Field Station of the London Research Centre.

BUDGET AND RESOURCES:	YEAR:	①	2	3	4	5	6	TOTAL
EXTERNAL PROJECTS	**Cost: ($000's)**							
	Operating:	1.7						1.7
	Salaries :	13.0						13.0
Budget	Total :	14.7						14.7
Source OPAC	**Man years:**	0.75						.75
INTERNAL PROJECTS	**Cost ($000's)**							
	DOE :							
	Salaries :							
Budget	Total :							
Source:	**Man years:**							

OUTPUT (papers, presentations, reports): Presentation at annual OPAC Symposium

EXTERNAL PARTICIPATION (other ministries, agencies):

COMMENTS

Note: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget budget source by organization (e.g. RAC, OPAC, WRB, NBR, etc.

DATE: June 5, 1987

REVISION:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Development of sex phermone traps for monitoring jackpine budworm

PROJECT NO: OPAC 87-22
START DATE: (m/yr): 3/87
RES. PRIORITY:

KEYWORDS: jack pine, budworm, phermone traps

MBR PROJECT CATEGORY:

RESEARCH CATEGORY: INTERNAL ____ OR EXTERNAL X
Solicited ____
Unsolicited X
Contract ____
Grant X

EXTERNAL PROJECTS:
PRINCIPAL INVESTIGATOR AND AFFILIATION: Dr. C. J. Sanders
Sault College of Applied Arts and Technology
Sault Ste. Marie (705-949-9461)

LIAISON OFFICER: (name, location, tel.no.) Dr. C. D. Fowle, OPAC

INTERNAL PROJECTS
PRINCIPAL INVESTIGATOR: (name, location, tel.no.)

SUPERVISOR:

OBJECTIVE(S): To determine the optimum blend and concentration of phermone components determine the appropriate phermone dispenser, and determine suitable trap design and deployment of traps.

PROJECT DESCRIPTION: Rearings will be completed and female insects will be sent for processing; work will continue with male moth bioassays to determine phermone components; plots will be established in areas with moderate to high density populations to set out traps with varying components and varying phermone dispensers.

BUDGET AND RESOURCES:	YEAR:	1 (84-13)	2 (86-14)	③	4	5	6	TOTAL
EXTERNAL	**Cost: ($000's)**							
PROJECTS	Operating:	0.6	2.379	0.1				3.0
	Salaries :	3.2	3.9	4.0				11.1
Budget	Total :	3.8	6.279	4.1				14.179
Source OPAC	**Man years:**	0.23	0.3	0.4				0.93
INTERNAL	**Cost ($000's)**							
PROJECTS	DOE :							
	Salaries :							
Budget	Total :							
Source:	**Man years:**							

OUTPUT (papers, presentations, reports):

Presentation at annual OPAC symposium.

EXTERNAL PARTICIPATION (other ministries, agencies):

COMMENTS

Note: **"External" refers to projects carried out by investigators outside the Ministry. Please indicate budget budget source by organization (e.g. RAC, OPAC, WRB, NBR, etc.**

DATE: June 5/87
REVISION:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Threshold for potato leafhoppers on potatoes in Ontario

PROJECT NO: OPAC 87-23
START DATE: 3/87
RES. PRIORITY:

KEYWORDS: potato leafhoppers, economic threshold

MBR PROJECT CATEGORY:

RESEARCH CATEGORY: INTERNAL ____ OR EXTERNAL X
Solicited ____ Contract ____
Unsolicited X Grant X

EXTERNAL PROJECTS:
PRINCIPAL INVESTIGATOR AND AFFILIATION: Dr. M.K. Sears
Dept. of Environmental Biology
University of Guelph, Guelph, Ontario
(519-824-4120)

LIAISON OFFICER: (name, location, tel.no.) Dr. C.D. Fowle, OPAC

INTERNAL PROJECTS
PRINCIPAL INVESTIGATOR: (name, location, tel.no.)

SUPERVISOR:

OBJECTIVE(S): A study of the relationship between leafhopper population and potato yield, leading to the determination of economic threshold for pesticide application.

PROJECT DESCRIPTION: Small field plots of 'Superior' potatoes will be established in 4-5 locations. Leafhoppers would be applied and zero (control) and flour threshold densities (10, 25, 50 and 100 adults per 20 sweep sample). In a more intensive experiment treatments of insects will be made to plants at various stages of growth; conventional insecticides before and after will eliminate insects from other than the infestation period. Plants will be monitored for hopper burn, rate of photosynthesis, movement of photosynthates and yield.

BUDGET AND RESOURCES:	YEAR:	1 (85-13)	2 (86-27)	③	4	5	6	TOTAL
EXTERNAL PROJECTS	**Cost: ($000's)**							
	Operating:	1.902	0.95	4.0				6.852
	Salaries :	6.0	13.5	14.0				33.5
Budget	Total :	7.902	14.45	18.0				40.352
Source OPAC	**Man years:**	0.42	1.5	1.3				3.22
INTERNAL PROJECTS	**Cost ($000's)**							
	DOE :							
	Salaries :							
Budget	Total :							
Source:	**Man years:**							

OUTPUT (papers, presentations, reports): Presentation at annual OPAC Symposium

EXTERNAL PARTICIPATION (other ministries, agencies):

COMMENTS

Note: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget budget source by organization (e.g. RAC, OPAC, WRB, MBR, etc.

DATE: June 5/87

REVISION:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: A barrier trapping technique for control of _Glischrochilus quadrisignatus_ and the assessment of the dispersal behaviour of the beetle between raspberry, corn and tomato fields

PROJECT NO: OPAC 87-24
START DATE: 3/87
RES. PRIORITY:

KEYWORDS: sap beetle, dispersal behaviour, picnic beetle

MBR PROJECT CATEGORY: -

RESEARCH CATEGORY: INTERNAL ____ OR EXTERNAL X
Solicited ____
Unsolicited X
Contract ____
Grant X

EXTERNAL PROJECTS:
PRINCIPAL INVESTIGATOR AND AFFILIATION: Dr. S.M. Smith, Biology Department, University of Waterloo, Waterloo, Ontario (519-885-1211)

LIAISON OFFICER: (name, location, tel.no.) Dr. C.D. Fowle, OPAC

INTERNAL PROJECTS
PRINCIPAL INVESTIGATOR: (name, location, tel.no.)

SUPERVISOR:

OBJECTIVE(S): To test chemical attractants in barrier traps for control of sap beetle in raspberries and to asses dispersal among crops by mark capture.

PROJECT DESCRIPTION: This beetle, a serious pest in tomatoes, raspberries and corn and vector of corn ear rot, responds to natural baits and chemical attractants suggesting mass trapping as a means of population suppression or crop protection. Traps will be set out in 6 raspberry fields to evaluate trapping effectiveness; 5 attractants will be tested as well during peak population times in July and August and differences in response notes; 12,000 beetles marked with flourescent dyes will be released simultaneously in corn, raspberry and tomato fields and recapture throughout the season noted.

BUDGET AND RESOURCES:	YEAR:	①	2	3	4	5	6	TOTAL
EXTERNAL PROJECTS	Cost: ($000's)							
	Operating:	1.4						1.4
	Salaries :	13.6						13.6
Budget	Total :	15.0						15.0
Source OPAC	**Man years:**	0.83						0.83
INTERNAL PROJECTS	Cost ($000's)							
	DOE :							
	Salaries :							
Budget	Total :							
Source:	**Man years:**							

OUTPUT (papers, presentations, reports): Presentation at annual OPAC Symposium

EXTERNAL PARTICIPATION (other ministries, agencies):

COMMENTS

Note: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget budget source by organization (e.g. RAC, OPAC, WRB, NBR, etc.

DATE: June 5, 1987
REVISION:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Fate of sulfonylurea herbicides in Ontario

PROJECT NO: OPAC 87-25
START DATE: 3/87
RES. PRIORITY:

KEYWORDS: Mobility, soil dissipation, herbicides, chlorsulfuron, metasulfuron methyl, sulfometuron methyl

MBR PROJECT CATEGORY:

RESEARCH CATEGORY: INTERNAL ____ OR EXTERNAL X
Solicited ____
Unsolicited X
Contract ____
Grant X

EXTERNAL PROJECTS:

PRINCIPAL INVESTIGATOR AND AFFILIATION:	Dr. G.R. Stephenson Dept. of Environmental Biology University of Guelph, Guelph, Ontario (519-824-4120)
LIAISON OFFICER: (name, location, tel.no.)	Dr. C.D. Fowle, OPAC

INTERNAL PROJECTS
PRINCIPAL INVESTIGATOR:
(name, location, tel.no.)

SUPERVISOR:

OBJECTIVE(S): To compare activity and mobility of chlorsulfuron, metsulfuron methyl and sulfometuron methyl in typical Ontario soil (lab and growth room study); and examine persistence and leaching of chlorsulfuron (Glean) on rough turf at maximum rates for non-crop land weed control

PROJECT DESCRIPTION:
a) bioassay for activity using Guelph loam and plants seeds in styrofoam cups: soybeans, sunflower, alfalfa, lentils, tomatoes.
b) use radio-labelled compounds in a soil column leaching study.
c) apply 70 and 120 ai/ha chlorsulfuron to rough turf plot and sample 1 hour, 1, 3, 7, 14, 28, 56, 84, 112 and 300 days after treatment. Soil cores will be divided into 4 depths prior to analysis.

BUDGET AND RESOURCES:	YEAR:	①	2	3	4	5	6	TOTAL
EXTERNAL PROJECTS	**Cost: ($000's)**							
	Operating:	2.0						2.0
	Salaries :	29.0						29.0
Budget	Total :	31.0						31.0
Source OPAC	**Man years:**	1.2						1.2
		Additional funds ($58,000) are provided by DuPont.						
INTERNAL PROJECTS	**Cost ($000's)**							
	DOE :							
	Salaries :							
Budget	Total :							
Source:	**Man years:**							

OUTPUT (papers, presentations, reports): Presentation at annual OPAC Symposium

EXTERNAL PARTICIPATION (other ministries, agencies):

COMMENTS

Note: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget budget source by organization (e.g. RAC, OPAC, WRB, MBR, etc.

DATE: June 5/87
REVISION:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Elimination of an insecticide resistent house fly population by sanitation and susceptible fly release

PROJECT NO: OPAC 87-26
START DATE: 3/87
RES. PRIORITY:

KEYWORDS: Resistant house files, sanitation control

MBR PROJECT CATEGORY:

RESEARCH CATEGORY: INTERNAL ____ OR EXTERNAL X
Solicited ____
Unsolicited X
Contract ____
Grant X

EXTERNAL PROJECTS:
PRINCIPAL INVESTIGATOR AND AFFILIATION: Dr. G.A. Surgeoner
Dept. of Environmental Biology
University of Guelph, Guelph, Ontario
(519-824-4120)

LIAISON OFFICER:
(name, location, tel.no.) Dr. C.D. Fowle, OPAC

INTERNAL PROJECTS
PRINCIPAL INVESTIGATOR:
(name, location, tel.no.)

SUPERVISOR:

OBJECTIVE(S): To continue sanitation programs on a dairy farm and swine facility to show efficacy and economic return of sanitation for house fly control; release susceptible flies; monitor resistance to permethrin and dichlorvos in fly population in Davies' barn.

PROJECT DESCRIPTION: Continue sanitation and fly release program in Davies' barn; examine effect of diets on fly production at swine facility. Determine LC_{50} values of permethrin and dichlorvos after susceptible flies mate with wild flies at Davies' barn; conduct bioassays at London facility to develop information on baseline resistance of resistant population, population (sanitation alone), population (sanitation plus fly release).

BUDGET AND RESOURCES:	YEAR:	1 (85-18)	2 (86-19)	③	4	5	6	TOTAL
EXTERNAL PROJECTS	**Cost: ($000's)**							
	Operating:	2.557	3.226	4.0				9.783
	Salaries :	4.4	4.6	13.5				22.5
Budget	Total :	6.957	7.826	17.5				32.283
Source OPAC	**Man years:**	0.3	0.3	1.3				1.9
INTERNAL PROJECTS	**Cost ($000's)**							
	DOE :							
	Salaries :							
Budget	Total :							
Source:	**Man years:**							

OUTPUT (papers, presentations, reports): Presentation for annual OPAC symposium. Paper planned for J. Econ. Entomology and article for Milk Marketing Board's Newsletter

EXTERNAL PARTICIPATION (other ministries, agencies):

COMMENTS

Note: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget budget source by organization (e.g. RAC, OPAC, WRB, NBR, etc.

DATE: OPAC 87-27
REVISION:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Biological control of strawberry and raspberry diseases.

PROJECT NO: OPAC 87-27
START DATE: 3/87
RES. PRIORITY:

KEYWORDS: biocontrol, strawberries, raspberries, grey mold, brown rot

MBR PROJECT CATEGORY:

RESEARCH CATEGORY: INTERNAL ____ OR EXTERNAL X
Solicited ____
Unsolicited X
Contract ____
Grant X

EXTERNAL PROJECTS:
PRINCIPAL INVESTIGATOR AND AFFILIATION: Dr. J.C. Sutton
Dept. of Environmental Biology
University of Guelph, Guelph, Ontario
(519-824-4120)

LIAISON OFFICER:
(name, location, tel.no.) Dr. C.D. Fowle, OPAC

INTERNAL PROJECTS
PRINCIPAL INVESTIGATOR:
(name, location, tel.no.)

SUPERVISOR:

OBJECTIVE(S): To monitor populations of saprotrophic and weakly parasitic fungi and bacteria on strawberries and raspberries and determine temporal relationship with pathogens of B. cinerea and Zythia sp.; isolate same and assess impact of chlorothalonil and dodine on these antagonistic organisms.

PROJECT DESCRIPTION:
1) Population on strawberry and raspberry leaves will be monitored at Arkell and Guelph. Microclimate variables will be monitored.
2) Various organisms from objective I will be isolated and maintained in culture. Those most promising will be tested in the field.
3) Field plots will be sprayed; populations of antagonists will be monitored in the plots from October to June.

BUDGET AND RESOURCES:	YEAR:	[✓ 1]	2	3	4	5	6	TOTAL
EXTERNAL	Cost: ($000's)							
PROJECTS	Operating:	5.8						5.8
	Salaries :	7.4						7.4
Budget	Total :	13.2						13.2
Source OPAC	**Man years:**	0.5						0.5
INTERNAL	Cost ($000's)							
PROJECTS	DOE :							
	Salaries :							
Budget	Total :							
Source:	**Man years:**							

OUTPUT (papers, presentations, reports): Presentation at annual OPAC Symposium

EXTERNAL PARTICIPATION (other ministries, agencies):

COMMENTS

Note: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget budget source by organization (e.g. RAC, OPAC, WRB, NBR, etc.

DATE: OPAC 87-29
REVISION:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Effects of processing on permethrin residues on Ontario vegetables

PROJECT NO: OPAC 87-29
START DATE: 3/87
RES. PRIORITY:

KEYWORDS: permethrin, food residues, cabbage green beans, processing effects

MBR PROJECT CATEGORY:

RESEARCH CATEGORY: INTERNAL ____ OR EXTERNAL X
Solicited ____
Unsolicited X
Contract ____
Grant X

EXTERNAL PROJECTS:
PRINCIPAL INVESTIGATOR AND AFFILIATION: Dr. A.B. Morrison
Dept. of Food Service
University of Guelph
(519-824-4120)

LIAISON OFFICER:
(name, location, tel.no.) Dr. C.D. Fowle, OPAC

INTERNAL PROJECTS
PRINCIPAL INVESTIGATOR:
(name, location, tel.no.)

SUPERVISOR:

OBJECTIVE(S): To determine the influence of processing on permethrin residues in green wax beans and cabbage.

PROJECT DESCRIPTION: Cabbage will be harvested 3 days after the last application of permethrin and analysed washed and boiled, washed, boiled, fresh. Green beans will be harvested 3 days after the last application of permethrin and analysed fresh, blanched, washed, boiled, washed and boiled. Both crops will also be placed under simulated commercial processing and analysed for cis and trans permethrin using gas chromatography.

BUDGET AND RESOURCES:	YEAR:	①	2	3	4	5	6	TOTAL
EXTERNAL PROJECTS	**Cost: ($000's)**							
	Operating:	8.2						8.2
	Salaries :	-						-
Budget	Total :	8.2						8.2
Source OPAC	**Man years:**	0.2						0.2
INTERNAL PROJECTS	**Cost ($000's)**							
	DOE :							
	Salaries :							
Budget	Total :							
Source:	**Man years:**							

OUTPUT (papers, presentations, reports): Presentation at annual OPAC Symposium

EXTERNAL PARTICIPATION (other ministries, agencies):

COMMENTS

Note: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget budget source by organization (e.g. RAC, OPAC, WRB, NMR, etc.

DATE: June 5/87
REVISION:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Development of a monoclonal antibody probe for eggs and larvae of the parasite *Pholetesor ornigis*

PROJECT NO: OPAC 87-30
START DATE: 5/87
RES. PRIORITY:

KEYWORDS: spotted tentiform leafminer, monoclonal antibody probe, *Pholetesor ornigis*

MBR PROJECT CATEGORY:

RESEARCH CATEGORY: INTERNAL ____ OR EXTERNAL X
Solicited ____ Contract ____
Unsolicited X Grant X

EXTERNAL PROJECTS:
PRINCIPAL INVESTIGATOR AND AFFILIATION: Dr. P. Faulkner
Dept. of Microbiology and Immunology
Queen's University, Kingston, Ontario
(613-545-2450)

LIAISON OFFICER: (name, location, tel.no.) Dr. C.D. Fowle, OPAC

INTERNAL PROJECTS
PRINCIPAL INVESTIGATOR: (name, location, tel.no.)

SUPERVISOR:

OBJECTIVE(S): Develop a monoclonal antibody probe to detect eggs and larvae parasite of spotted tentiform leafminer (*Phyllonorycter blancardella*). Once specific probes for this parasite are identified, they can be used to develop a kit for the field or laboratory detection of the parasite. Where the parasite is present, use of chemical sprays are not needed.

PROJECT DESCRIPTION: Immunizing antigen will be acquired and prepared from eggs and larvae. Polyclonal antibodies and monoclonal antibodies will be produced in mice. The reliability of monoclonal antibodies for identifying parasitized early instar spotted tentiform leafminer larvae will be assessed. ELISA technique will be used.

BUDGET AND RESOURCES:	YEAR:	[✓ 1]	2	3	4	5	6	TOTAL
EXTERNAL PROJECTS	Cost: ($000's)							
	Operating:	3.5						3.5
	Salaries :	5.0						5.0
Budget	Total :	8.5						8.5
Source OPAC	**Man years:**	0.2						0.2
INTERNAL PROJECTS	Cost ($000's)							
	DOE :							
	Salaries :							
Budget	Total :							
Source:	**Man years:**							

OUTPUT (papers, presentations, reports): Presentation at annual OPAC Symposium

EXTERNAL PARTICIPATION (other ministries, agencies):

COMMENTS

Note: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget budget source by organization (e.g. RAC, OPAC, WRB, MBR, etc.

DATE: June 5/87
REVISION:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: The role of parasitoids in the collapse of jack pine budworm populations.

PROJECT NO: OPAC87-31
START DATE: 5/87
RES. PRIORITY:

KEYWORDS: parasitoids, jack pine budworm

MBR PROJECT CATEGORY:

RESEARCH CATEGORY: INTERNAL ____ OR EXTERNAL X
Solicited ____
Unsolicited X
Contract ____
Grant X

EXTERNAL PROJECTS:
PRINCIPAL INVESTIGATOR AND AFFILIATION:
Dr. V.G. Nealis
Sault College of Applied Arts and Technology
Sault Ste Marie, Ontario
(705-949-9461)

LIAISON OFFICER:
(name, location, tel.no.)
Dr. C.D. Fowle, OPAC

INTERNAL PROJECTS
PRINCIPAL INVESTIGATOR:
(name, location, tel.no.)

SUPERVISOR:

OBJECTIVE(S): Carry out a detailed analysis of existing data to examine the relationship between parasitism and jack pine budworm cycles, leading to improvements in the ability to forecast expected defoliation from larval sampling.

PROJECT DESCRIPTION: In 1985, a sampling technique was investigated to estimate the proportion of the jack pine budworm population that was parasitized and identify the proportion of dominant parasites: Apanteles fumiferanae and Glypta fumiferanae. In 1986, the effect of B.t. on these parasitoids was examined. This year data on density estimates will be combined with information derived from sampling and rearing or dissecting budworms collected from branch samples throughout the insect life cycle to provide a profile of natural mortality in outbreak populations and in those populations which are undergoing rapid decline.

BUDGET AND RESOURCES:	YEAR:	1 (85-26)	2 (86-34)	3	4	5	6	TOTAL
EXTERNAL	**Cost: ($000's)**							
PROJECTS	Operating:	3.42	0.9	0.5				4.82
	Salaries :	4.0	5.5	9.5				19.00
Budget	Total :	7.42	6.4	10.0				23.82
Source OPAC	**Man years:**	1.0	0.33	0.51				1.84
INTERNAL	**Cost ($000's)**							
PROJECTS	DOE :							
	Salaries :							
Budget	Total :							
Source:	**Man years:**							

OUTPUT (papers, presentations, reports):

EXTERNAL PARTICIPATION (other ministries, agencies): Presentation at annual OPAC Symposium

COMMENTS

Note: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget budget source by organization (e.g. RAC, OPAC, WRB, NBR, etc.

DATE: June 8/87
REVISION:

SCIENTIFIC RESEARCH AND DEVELOPMENT INVENTORY

PROJECT TITLE: Study of deposition of airborne contaminants in the Great Lakes Basin using lichens and mosses

PROJECT NO: OPAC 87-32
START DATE: 5/87
RES. PRIORITY:

KEYWORDS: airborne contaminants, Great Lakes Basin; lichens and mosses, bio-monitors

MBR PROJECT CATEGORY:

RESEARCH CATEGORY: INTERNAL ____ OR EXTERNAL X
Solicited ____
Unsolicited X
Contract ____
Grant X

EXTERNAL PROJECTS:
PRINCIPAL INVESTIGATOR AND AFFILIATION: Dr. P.M. Stokes and Dr. D.M. Whelpdale
Institute of Environmental Studies
University of Toronto, Toronto, Ontario

LIAISON OFFICER: (name, location, tel.no.) Dr. C.D. Fowle, OPAC

INTERNAL PROJECTS
PRINCIPAL INVESTIGATOR: (name, location, tel.no.)

SUPERVISOR:

OBJECTIVE(S): Complete analyses of organic and metal contaminants from samples collecte late fall 1986 and continue sampling lichen Cladina rangiferina and Sphagnum moss at select sites around the Upper Great Lakes.

PROJECT DESCRIPTION: On the basis of 1986 results, sample 10 sites in the fall and make collections of lichens and mosses in June, July, August, September and October at 3 sites (subset of the 10) to test for variability. Samples will be analysed for 5 PCB groups, 23 chlorinated hydrocarbon groups, 17 polycyclic aromatic hydrocarbon groups and 14 metals.

BUDGET AND RESOURCES:	YEAR:	1 (86-30)	[✓ 2]	3	4	5	6	TOTAL
EXTERNAL PROJECTS	Cost: ($000's)							
	Operating:	13.5	11.5					25.0
	Salaries :	1.5	3.5					5.0
Budget	Total :	15.0	15.0					30.0
Source OPAC	**Man years:**	0.3	0.5					0.8
		Funding also from WTF ((Wildlife Toxicology Fund) Atmospheric Environment Service.						
INTERNAL PROJECTS	Cost ($000's)							
	DOE :							
	Salaries :							
Budget	Total :							
Source:	**Man years:**							

OUTPUT (papers, presentations, reports): Presentation at annual OPAC Symposium

EXTERNAL PARTICIPATION (other ministries, agencies):

COMMENTS

Note: "External" refers to projects carried out by investigators outside the Ministry. Please indicate budget budget source by organization (e.g. RAC, OPAC, WRB, WMR, etc.